

Adaptation practices of Albay

Training Workshop Climate Change for National & Local Govts in Southeast Asia and South Asia ICLEI

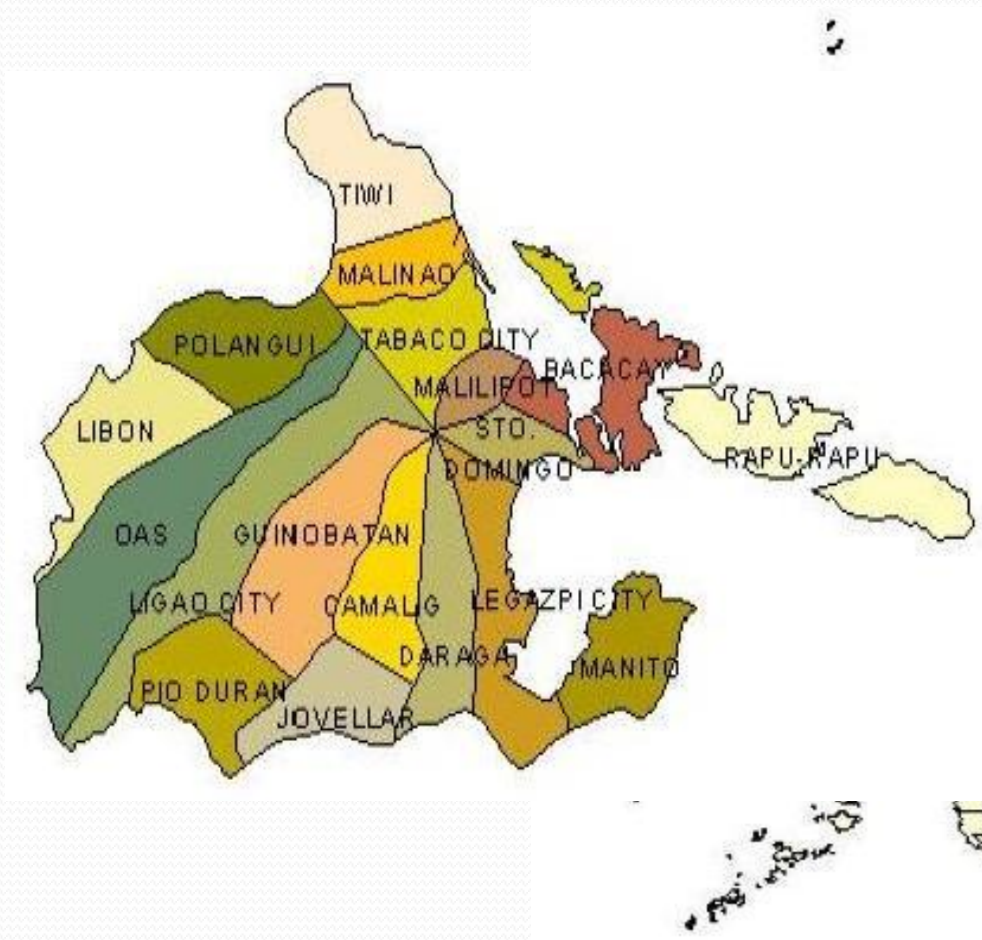
Richmonde Hotel, 11 February 2012



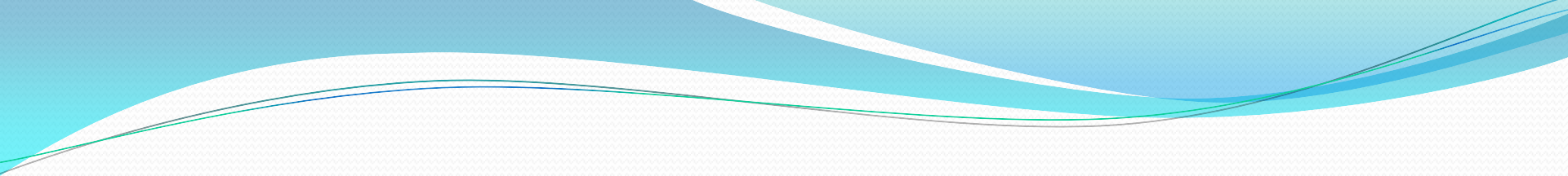
Governor Joey Sarte Salceda
Climate Change Academy
Province of Albay, Philippines



Province of ALBAY



- ❑ Land Area = 2,552 sq. km.
- ❑ Population = 1,190, 823 (Aug 2007)
- ❑ Households = 231,750
- ❑ 3 legislative districts; 3 cities, 15 municipalities
- ❑ 2nd largest Province in the Bicol Region
- ❑ 4 major islands (CRaBS)
- ❑ Total coastline of 364 kms with 149 coastal barangays and 128,751 people

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- ☑ Multi-hazards: climate and geological
 - ☑ Persistent poverty
 - ☑ Net resource hemorrhage

THE CHALLENGE

Disaster Risk and Vulnerability of Albay

- 19 to 21 occurrences of typhoon per year in the Philippines of which 3-5 major direct hits on Province of Albay.
- About 198,000 houses threatened by wind destructions and at least 350,000 people have to evacuate.
- Mayon Volcano eruption threatens 3 cities and 5 municipalities
- 127 villages or 11,000 to 12,000 families threatened by landslides
- About 300,000 population out of 1.2M threatened by tsunami
- Eight municipalities and two cities threatened by floods.

**Vatican of
Disasters**

Jan 2011 Disaster Risk Analysis

NAME OF CITY/ MUNICIPALITY	FLOODING					LANDSLIDE					MUDFLOW / LAHAR				
	No. of Bgys Affected	Families Affected	30% of the Affected families	Population	30% of the population	No. of Bgys Affected	Families Affected	100% of the Affected families	Population	100% of the population	No. of Bgys Affected	Families Affected	40% of the Affected families	Population	40% of the population
1. TIWI	17	1,987	596	10,281	3,084	8	934	934	4,794	4,794			-		-
2. MALINAO	26	2,991	897	14,589	4,377	12	1,874	1,874	5,547	5,547			-		-
3. TABACO CITY	40	1,062	319	5,535	1,661	2	122	122	645	645	11	5,134	2,054	28,008	11,203
4. MALILIPOT	17	608	182	3,173	952	6	209	209	942	942	3	1,476	590	7,298	2,919
5. BACACAY	53	1,193	358	6,207	1,862	7	451	451	2,396	2,396	1	2,505	1,002	6,980	2,792
6. STO. DOMINGO	14	464	139	2,425	728	5	446	446	1,563	1,563	5	2,990	1,196	12,834	5,134
7. LEGAZPI CITY	66	16,372	4,912	84,182	25,255	10	305	305	1,611	1,611	8	5,348	2,139	23,814	9,526
8. RAPU-RAPU	33	1,392	418	7,993	2,398	5	522	522	2,643	2,643			-		-
9. MANITO	12	958	287	5,802	1,741	13	1,063	1,063	6,376	6,376			-		-
10. DARAGA	26	2,393	718	11,584	3,475	6	669	669	3,450	3,450	17	10,431	4,172	47,888	19,155
11. CAMALIG	23	4,604	1,381	24,105	7,232	10	822	822	4,228	4,228	7	3,220	1,288	16,075	6,430
12. GUINOBATAN	18	2,923	877	15,214	4,564	4	14	14	84	84	8	4,545	1,818	18,948	7,579
13. JOVELLAR	13	302	91	1,603	481	3	54	54	282	282			-		-
14. LIGAO CITY	29	897	269	4,608	1,382	21	1,928	1,928	10,052	10,052	7	2,080	832	10,820	4,328
15. PIODURAN	10	1,691	507	8,799	2,640	9	134	134	699	699			-		-
16. OAS	18	1,946	584	13,663	4,099	11	1,841	1,841	9,530	9,530			-		-
17. POLANGUI	25	7,136	2,141	35,999	10,800	12	1,115	1,115	5,777	5,777			-		-
18. LIBON	28	7,465	2,240	38,822	11,647	8	819	819	3,345	3,345			-		-
TOTAL	468	56,384	16,915	294,584	88,375	152	13,322	13,322	63,964	63,964	67	37,729	15,092	172,665	69,066

Sources: MGB V; CDCCs/MDCCs/BDCCs; NSO 2007

NOTE: Some of the population threatened by Mayon Volcano eruption are also threatened by other hazards like flood and lahar due to weather hazards. Some Coastal Barangays which are threatened by Storm Surge/Tsunami are also threatened by flooding. Hence, overlapping on total number of population (by barangay) affected by 2 or more types of hazards is possible.

Disaster Risk Ranking of Albay

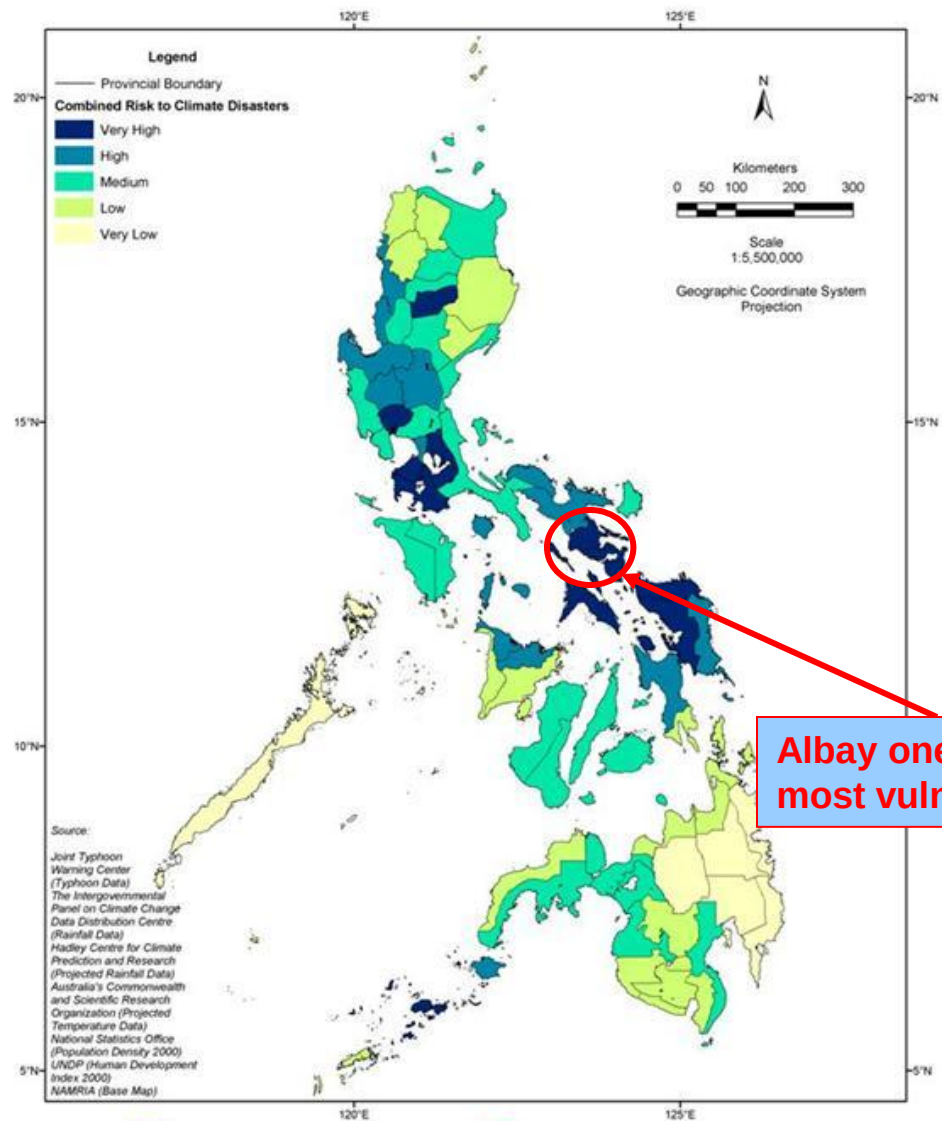
Type of Disaster Risk	Type of Hazard	Ranking
Climate Weather Related	(Historical) Typhoons	5 th
	(Projected) Rainfall Increase	1 st
	(Projected) Temperature Increase	16 th
	(Historical) El Nino	54 th
Geophysical (History)	Earthquake-Induced Shallow Landslides	1 st
	Earthquakes	59 th
	Tsunami	1 st
	Volcanic Eruptions	2 nd

Jan 2011 Risk Analysis

NAME OF CITY/ MUNICIPALITY	TOTAL (30%FLOODING +100% LANDSLIDE + 40%MUDFLOW/LAHAR)		TOTAL (FLOODING + LANDSLIDE + MUDFLOW/LAHAR)	
	Families	Population	Families	Population
1. TIWI	1,530	7,878	2,921	15,075
2. MALINAO	2,771	9,924	4,865	20,136
3. TABACO CITY	2,494	13,509	6,318	34,188
4. MALILIPOT	982	4,813	2,293	11,413
5. BACACAY	1,811	7,050	4,149	15,583
6. STO. DOMINGO	1,781	7,424	3,900	16,822
7. LEGAZPI CITY	7,356	36,391	22,025	109,607
8. RAPU-RAPU	940	5,041	1,914	10,636
9. MANITO	1,350	8,117	2,021	12,178
10. DARAGA	5,559	26,080	13,493	62,922
11. CAMALIG	3,491	17,890	8,646	44,408
12. GUINOBATAN	2,709	12,227	7,482	34,246
13. JOVELLAR	145	763	356	1,885
14. LIGAO CITY	3,029	15,762	4,905	25,480
15. PIODURAN	641	3,339	1,825	9,498
16. OAS	2,425	13,629	3,787	23,193
17. POLANGUI	3,256	16,577	8,251	41,776
18. LIBON	3,059	14,992	8,284	42,167
TOTAL	45,329	221,405	107,435	531,213

Sources: MGB V; CDCCs/MDCCs/BDCCs; NSO 2007

Combined Risk to Climate Disasters



Albay one of the most vulnerable



MANILA OBSERVATORY



DEPARTMENT OF ENVIRONMENT AND
NATURAL RESOURCES

Average annual losses to infrastructure and agriculture in 10 most vulnerable provinces vs. their 2006 local calamity funds

<i>Province</i>	(1) <i>LCF</i>	(2) <i>AAL INF</i>	(3) <i>AAL AGR</i>	(1) - (2) - (3) <i>Residual</i>
Albay	38,206,846	181,681,463	83,087,145	(226,561,762)
Aurora	15,372,128	157,067,625	10,635,058	(152,330,555)
Leyte	45,889,351	152,047,750	21,865,369	(128,023,768)
Northern Samar	24,105,875	137,116,250	5,689,359	(118,699,735)
Camarines Sur	40,279,550	135,439,000	173,851,548	(269,010,998)
Western Samar	25,909,160	100,295,875	11,638,987	(86,025,702)
Eastern Samar	20,636,040	78,787,500	12,184,160	(70,335,620)
Sorsogon	28,002,809	77,714,250	79,660,002	(129,371,442)
Catanduanes	15,285,628	65,753,579	41,626,084	(92,094,035)
Quezon	60,531,722	62,009,699	48,098,181	(49,576,158)
Total	314,219,109	1,147,912,992	488,335,892	(1,322,029,775)

Source: World Bank

POVERTY HEIGHTENS EXPOSURE TO DISASTER RISKS

Region/Province	Annual Per Capita Poverty Threshold (in Pesos)			Poverty Incidence Among Families (%)						Magnitude of Poor Families					
				Estimates (%)			Coefficient of Variation			Estimates			Coefficient of Variation		
	2000	2003	2006	2000	2003	2006	2000	2003	2006	2000	2003	2006	2000	2003	2006
PHILIPPINES	11,458	12,309	15,057	27.5	24.4	26.9	1.6	1.3	1.3	4,146,663	4,022,695	4,677,305	1.6	1.4	1.3
Region V	11,375	12,379	15,015	45.3	40.6	41.8	4.2	3.6	3.5	407,176	383,625	422,278	4.7	4.3	4.3
Albay	12,144	12,915	16,128	40.3	34.4	37.8	11.5	8.1	8.4	83,398	76,200	88,676	11.2	8.5	10.1
Camarines Norte	11,505	12,727	14,854	52.7	46.1	38.4	10.9	14.4	18.8	50,670	44,874	39,421	11.8	14	22.6
Camarines Sur	11,054	11,873	14,634	40.8	40.1	41.2	9.3	7.0	5.6	120,762	121,936	134,599	11.8	7.7	6.6
Catanduanes*	11,587	11,815	13,654	43.9	31.8	37.3	10.9	10.3	22.1	18,541	13,604	16,999	10.4	29.3	33.3
Masbate	11,019	12,504	14,248	61.3	55.9	51.0	5.8			11,804	80,512		5.9	7.4	8.0
Sorsogon	11,146	12,452	15,687	41.4	33.7	43.5	7.3			5,207	62,071		7.6	14.5	5.6

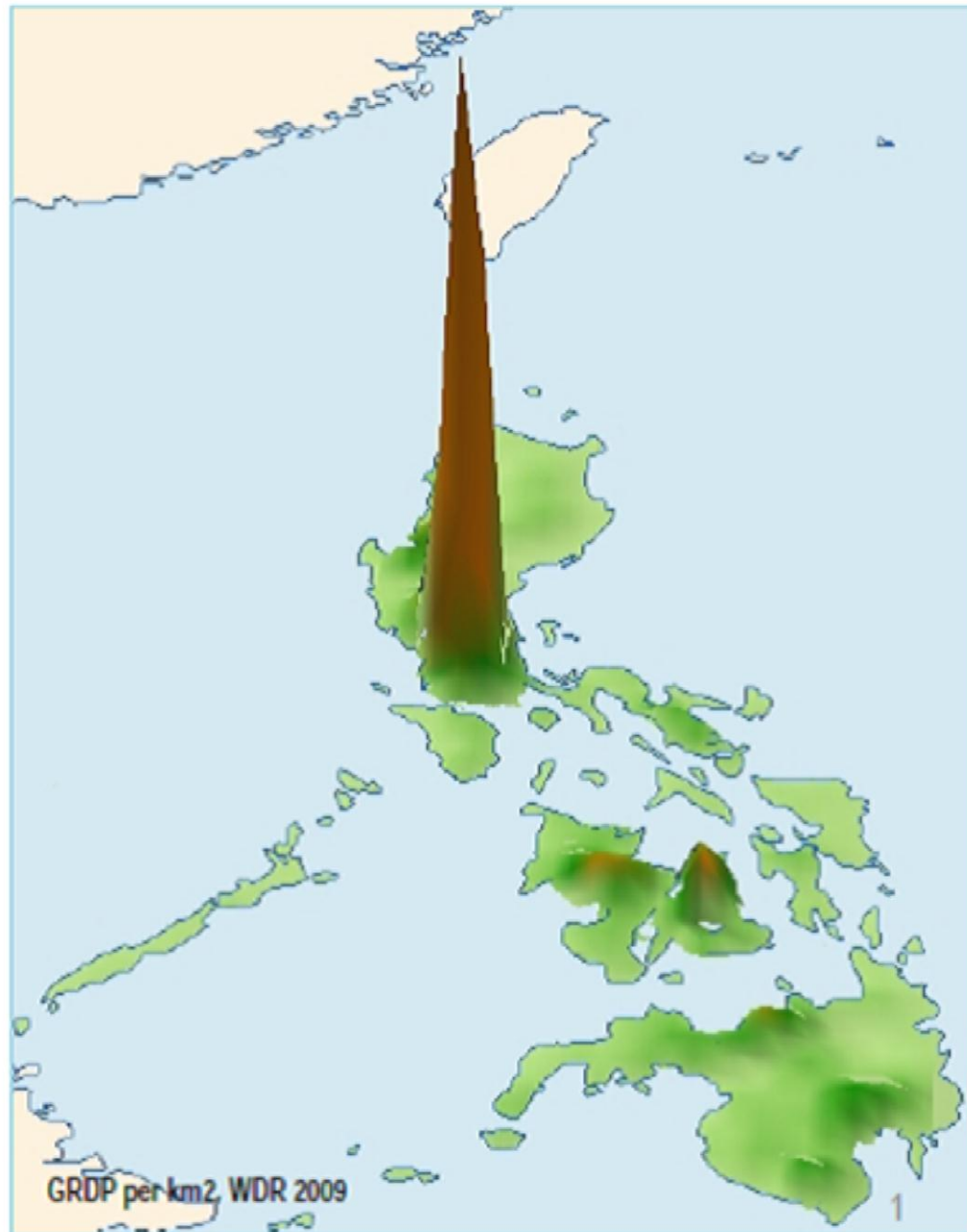
* Coefficient of Variation (CV) of 2006 poverty incidence is greater than 20%

Albay poverty incidence at 37.8%, while lowest in region, remains high

Climate Disasters endanger MDGs

Implications of Climate Change for Certain Key Millennium Development Goals

<i>Millennium Development Goals</i>	<i>Linkages with climate</i>
MDG 1 Eradicate extreme poverty and hunger	The Millennium Development Goal of eradicating extreme poverty and hunger involves reducing, by 50%, the number of people living on \$1 per day and the people affected by hunger (with 1990 as baseline). It also encompasses the provision of productive employment for all. Destruction of livelihood assets due to climate disasters, and the financial requirements of adaptation and mitigation, hit at the core of development – poverty alleviation. Climate variability, prevalence of floods and droughts, and the resultant water stress, have a pronounced influence on farm productivity and consequently world food security. Rising food prices make basic nutrition inaccessible while also reducing the finances available with the poor for education and health services.
MDG 2 Achieve universal primary education	Destruction of educational infrastructure and deterioration in standards of living due to adverse climate conditions will impede achievement of universal primary education. Displacement due to climate-related catastrophes can further exacerbate the situation.
MDG 3 Promote gender equality and empower women	Women, given their roles in the household (which involve significant interaction with the environment), will face the brunt of climate change. Agriculture, an important source of livelihood for women in rural areas, is one sector that is expected to be amongst the worst hit.
MDG 4 Reduce child mortality	Programmes targeted at achieving health-related MDGs will need to contend with rise in the incidence of vector-borne and water-borne diseases, and growing malnutrition. (The endemicity and epidemicity of vectorborne diseases like malaria are influenced by climate changes [Hellmuth and Bhojwani 2007]).
MDG 7 Ensure environmental sustainability	Climate change is closely tied with resource loss and nonavailability of adequate and quality water services, even while GHG emissions contributing to climate change are amongst the biggest threat to the environment.
MDG 8 Develop a global partnership for development	Developing a global partnership for development is not only a stand- alone MDG but is key to meeting the other goals as well. Climate change provides both a challenge and opportunity for building a global partnership that is equitable and effective. Environment as a 'global common' needs to be governed in a framework of transnational governance that takes on board the interests of all countries and communities.



- ✓ Zero casualty in 16 years until 2011 struck
- ✓ Surge in private investments
- ✓ Fastest growth among regions
- ✓ MDGs achieved ahead of 2015
- ✓ Two national laws enacted used Albay model

THE OUTCOMES

Major Disaster Events in Albay Province 1994-2011:

Zero Casualty in 16 years except 2006 and 2011

Calamities	Date	Classification	Casualty	Damage Cost
1. Typhoon Rosing	Nov. 3, 1995	Destructive	ZERO	P 1.7 B
2. Typhoon Loleng	Nov. 2, 1008	Destructive	ZERO	7.1 B
3. Mayon Eruption	Feb. 2000	Explosive	ZERO	284 M
4. Mayon Eruption	June 2001	Explosive	ZERO	300 M
5. Mayon Eruption	July 2006	Explosive	ZERO	50.5 M
6. Typhoon Milenyo	Sept. 27 2006	Destructive	14 dead	1.3 B
7. Typhoon Reming	Nov. 30, 2006	Destructive	604 dead 419 missing	3.7 B
8. Typhoon Mina, Lando and Nonoy	Nov. 2007	Destructive	ZERO	
9. TECF, Monsoon Rains	Feb. 2008	Destructive	ZERO	127 M
10. Typhoon Dante	April 2009	Destructive	ZERO	
11. Typhoon Ondoy	Sep. 2009	Destructive	ZERO	
12. Typhoon Peping	Oct. 2009	Destructive	ZERO	
13. Mayon Eruption	Dec. 14, 2009 – Jan. 2, 2010	Explosive	ZERO	

Entry of big ticket corporate investors in 2007-10, after Reming, Milenyo and Mayon

Corporation	Amount (Pbn)	Investment
APRI	4.50	Acquisition by APRI of 135MW Tiwi power plant
EDC	14.00	Development of new 40MW (up to 240MW) Kayabon geothermal capacity, on top of existing 240MW.
Raintree	3.00	Misibis
Sunwest	0.10	Hotel St. Ellis
Chan	0.05	Casablanca Suites
Sunwest	1.50	Embarcadero
LG / KORES	5.00	Acquisition of Lafayette
LKY	1.00	Modernization of Mayon Imperial Hotel
Legazpi Oil Mills	0.45	500mt/day
Globe Phils	0.50	300MT/ay
CAAP	3.40	Southern Luzon Intl Airport
Chevron	3.00	Tiwi geothermal steam generation
Total	36.50	

GRDP 2009

REGIONAL ACCOUNTS OF THE PHILIPPINES

Unit : In Percent

Table 1.3B GROSS REGIONAL DOMESTIC PRODUCT

2007 TO 2009

AT CONSTANT PRICES

GROWTH RATES

REGION / YEAR	07-08	08-09
PHILIPPINES	3.7	1.1
NCR METRO MANILA	4.7	(0.4)
CAR CORDILLERA	1.7	2.0
I ILOCOS	2.0	(1.0)
II CAGAYAN VALLEY	1.7	1.9
III CENTRAL LUZON	3.7	(1.4)
IVA CALABARZON	1.9	(1.6)
IVB MIMAROPA	3.0	0.8
V BICOL	4.1	8.2
VI WESTERN VISAYAS	4.3	5.9
VII CENTRAL VISAYAS	3.3	0.8
VIII EASTERN VISAYAS	3.4	1.8
IX ZAMBOANGA PENINSULA	2.0	6.8
X NORTHERN MINDANAO	5.2	2.9
XI DAVAO REGION	3.7	5.4
XII SOCCSKSARGEN	4.5	1.3
ARMM MUSLIM MINDANAO	1.6	2.6
XIII CARAGA	2.7	2.7

Note: GDP series not linked with previous years due to revisions in some sectors.

Source: National Statistical Coordination Board

MDGs are achieved ahead of 2015 exc. MDG 2 and 7

Goal	Indicator	Bicol Region	Albay
1	Poverty Incidence	M	H
	Subsistence Incidence	H	H
	Underweight (IRS)	H	H
2	Participation - Elementary	L	H
	Cohort survival - elementary	M	M
3	Gender parity - elementary	H	H
4	Under-five mortality	H	H
	Infant mortality	H	H
	Proportion of fully-immunized children	M	H
5	Maternal mortality rate	L	H
	Contraceptive prevalence rate	L	M
	Condom use rate	L	M
6	Deaths due to TB	L	H
	Malaria positive cases	H	H
7	Household with access to sanitary toilets	H	L
	Household with access to safe drinking water	H	H

Legend:

L	low probability	H	high probability
M	medium probability		no data

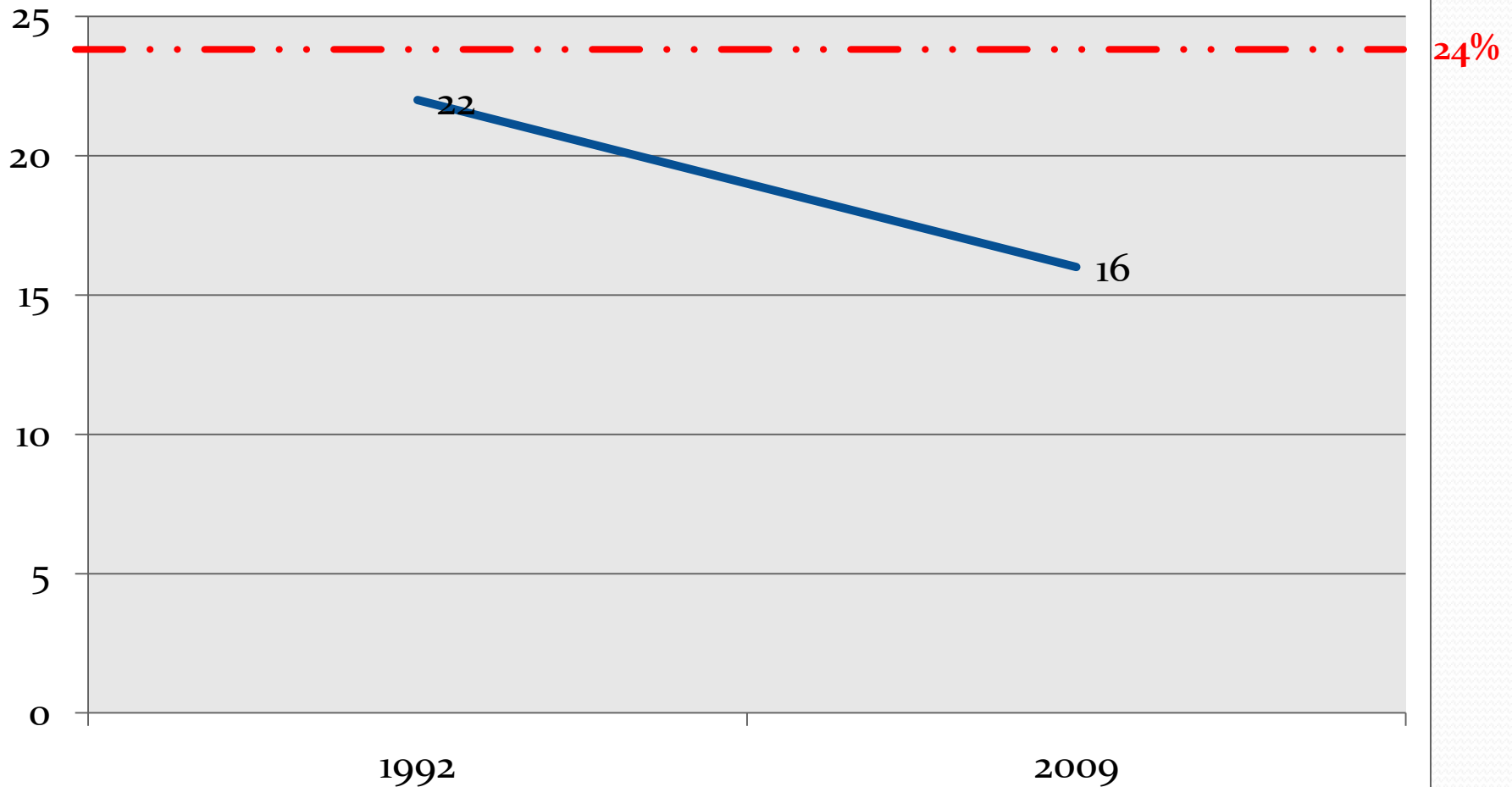


Two National Laws

- Two national laws on DRR and CCA were based on Albay model
 - RA 10121 or **“The Philippine Disaster Risk Reduction and Management Act of 2010”** that mandates to institutionalize a Disaster Risk Reduction and Management Office aside from the Council.
 - RA 9729 or “The Climate Change Commission Law of 2009”

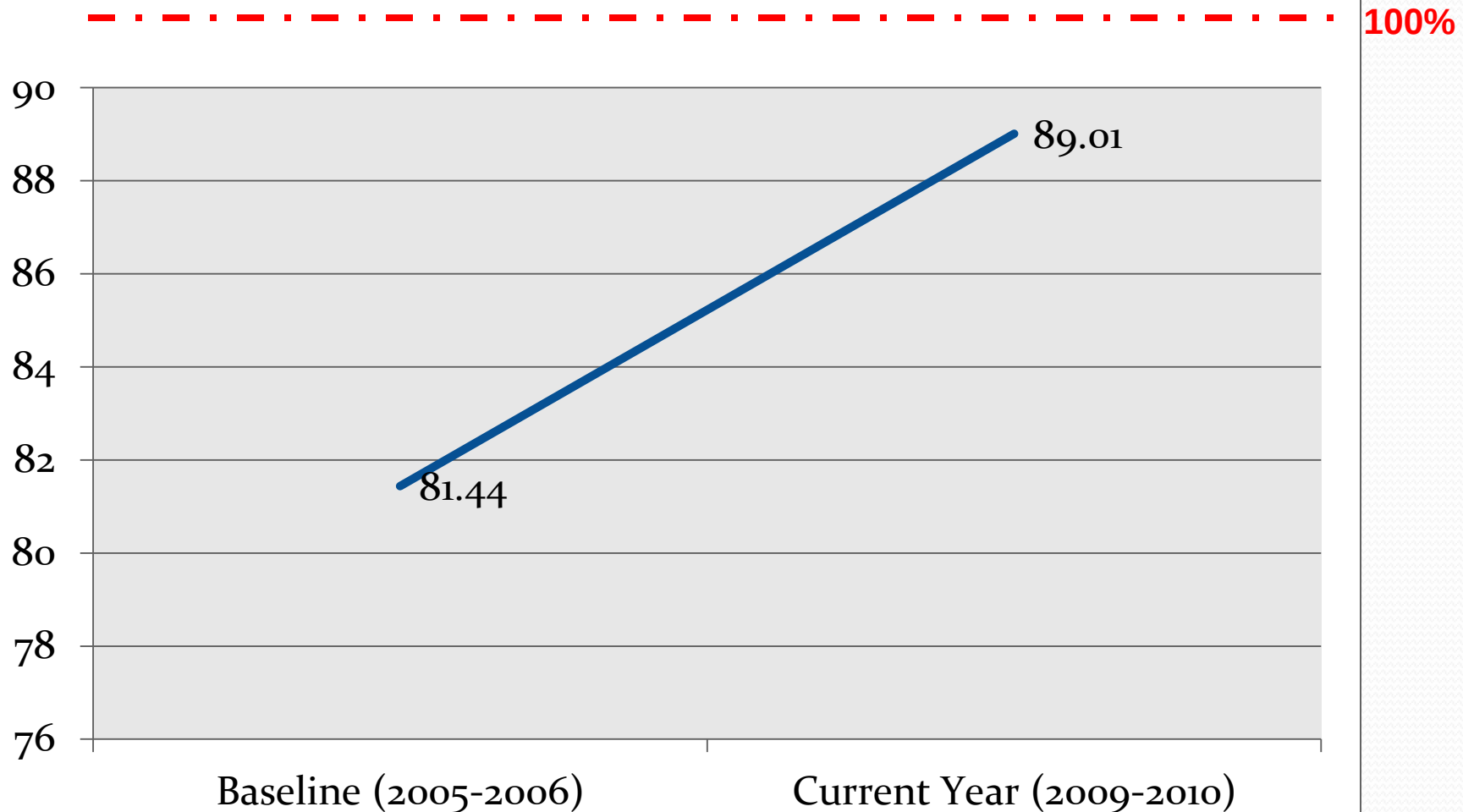
Achievements on MDG, 2009

Proportion of 0 - 5 years old who are malnourished



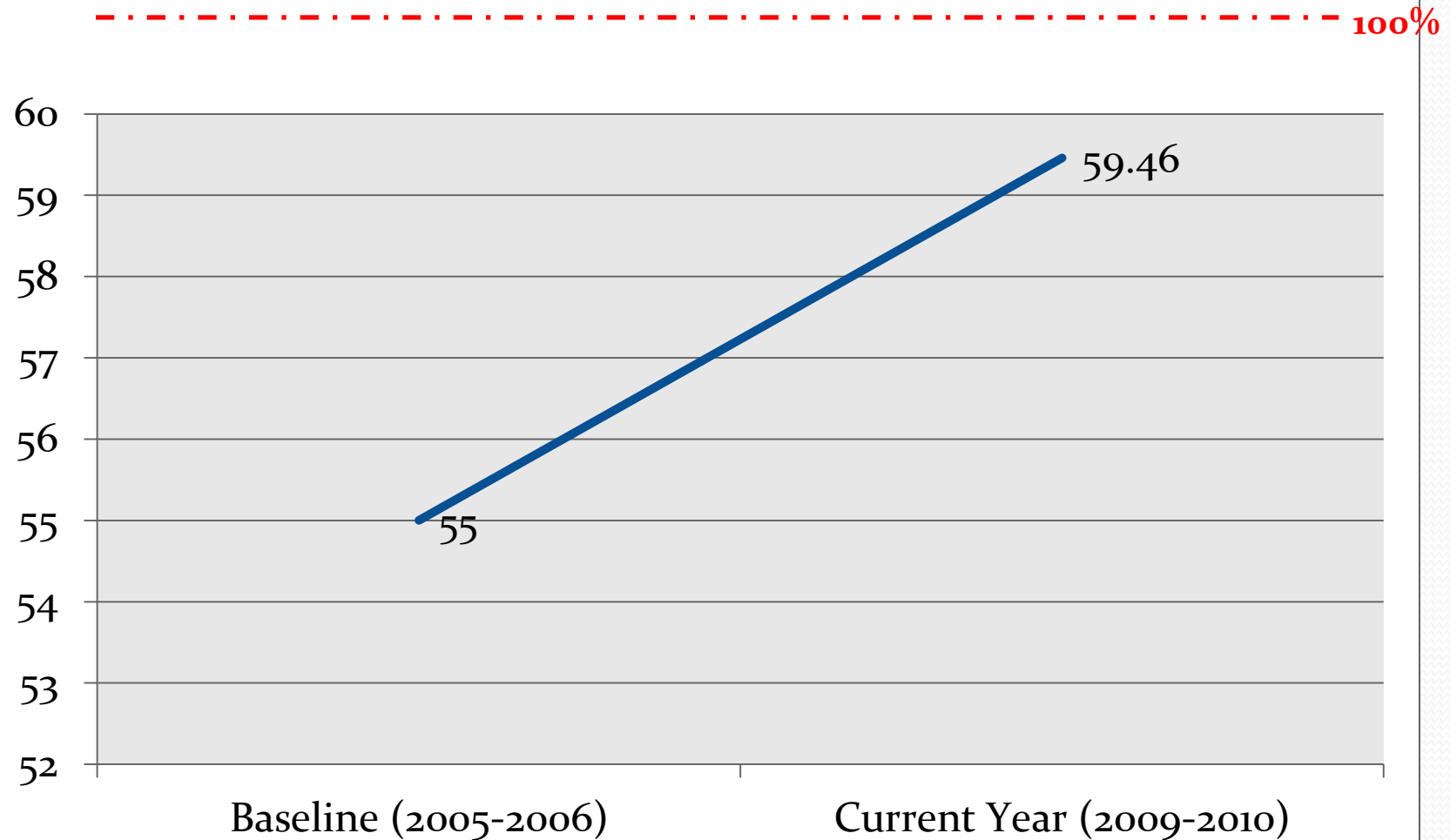
Achievements on MDG, 2009

School Participation for Elementary School (%)



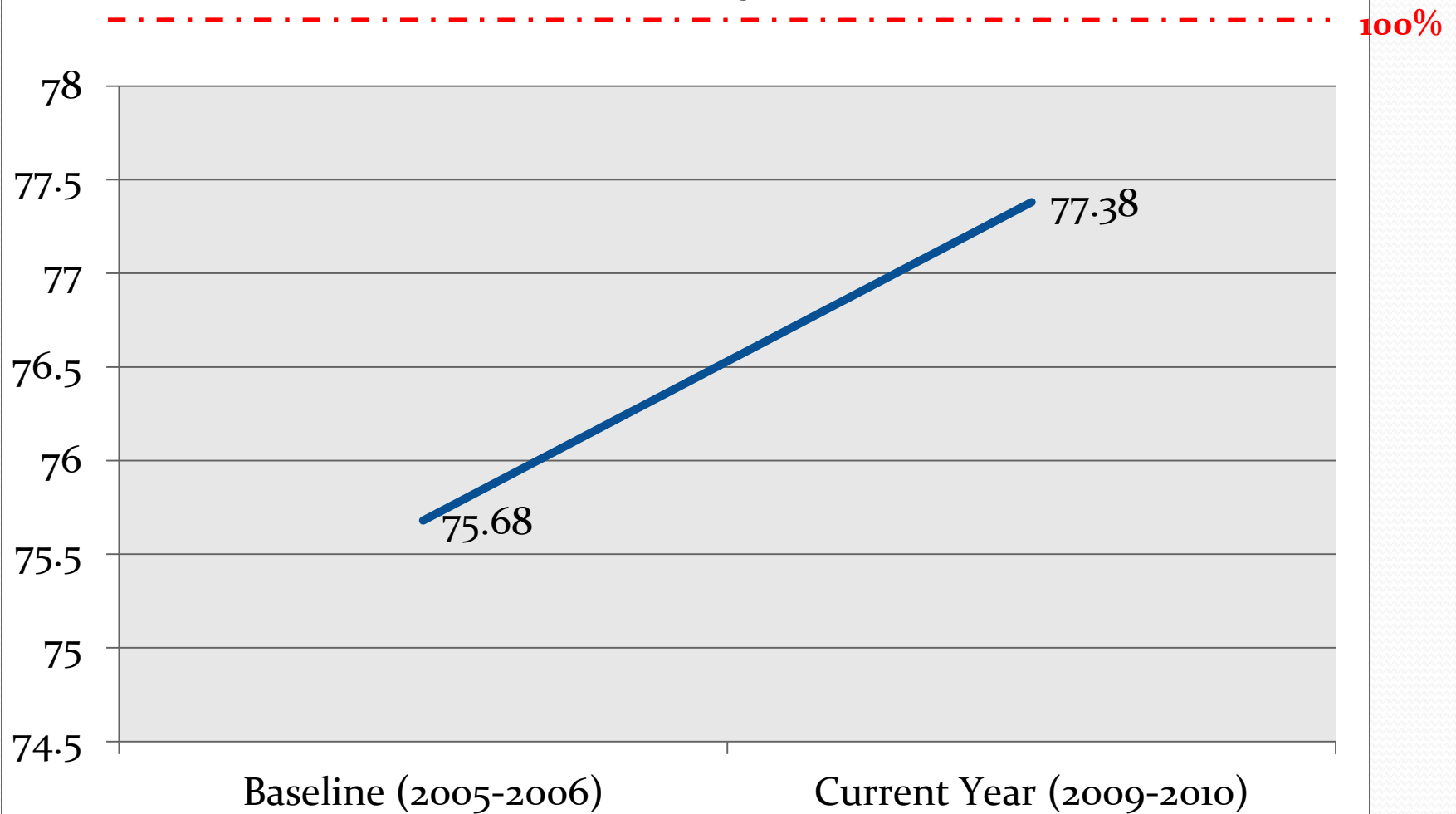
Achievements on MDG, 2009

School Participation for High School



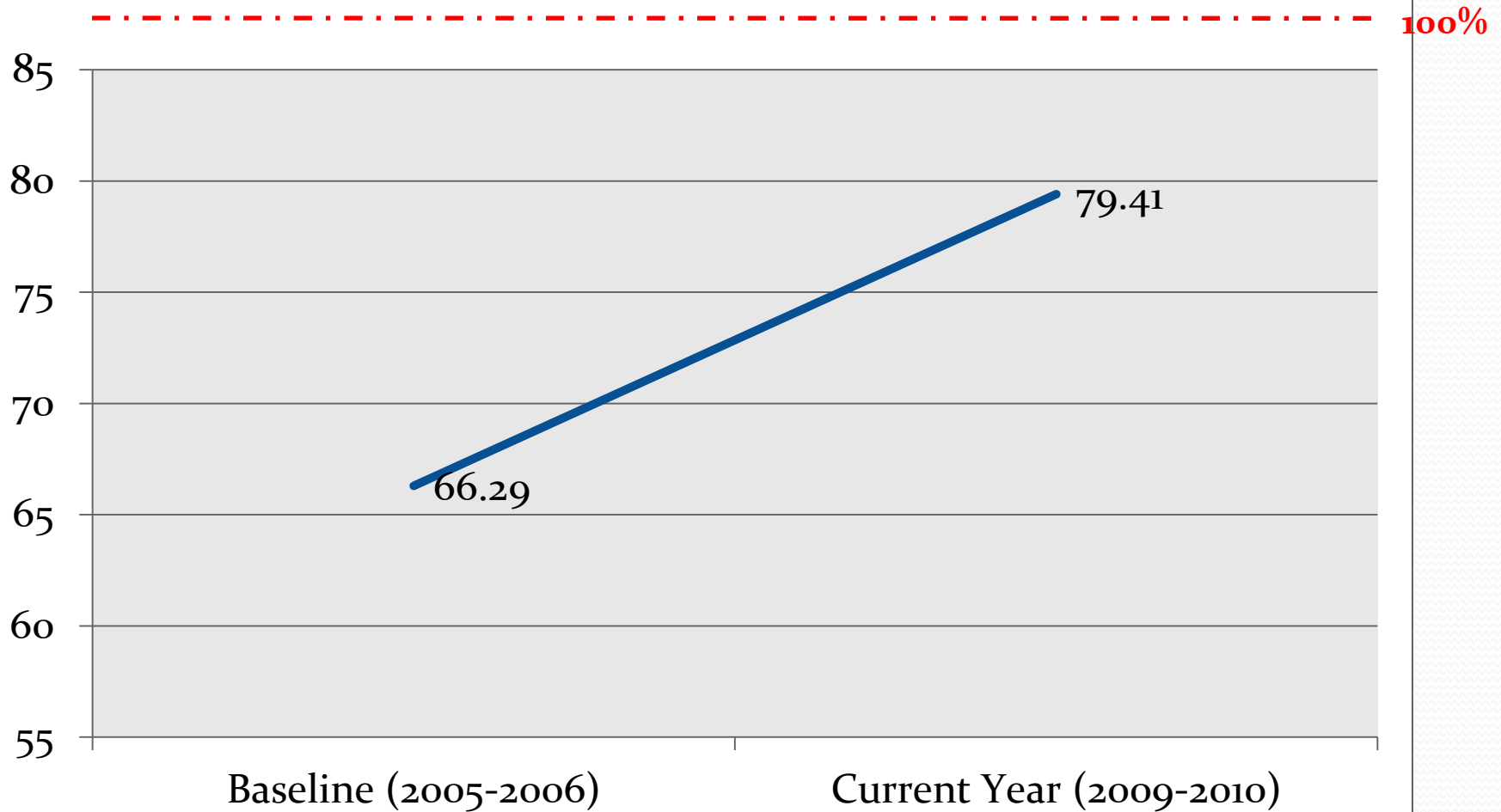
Achievements on MDG, 2009

Cohort Survival for Elementary

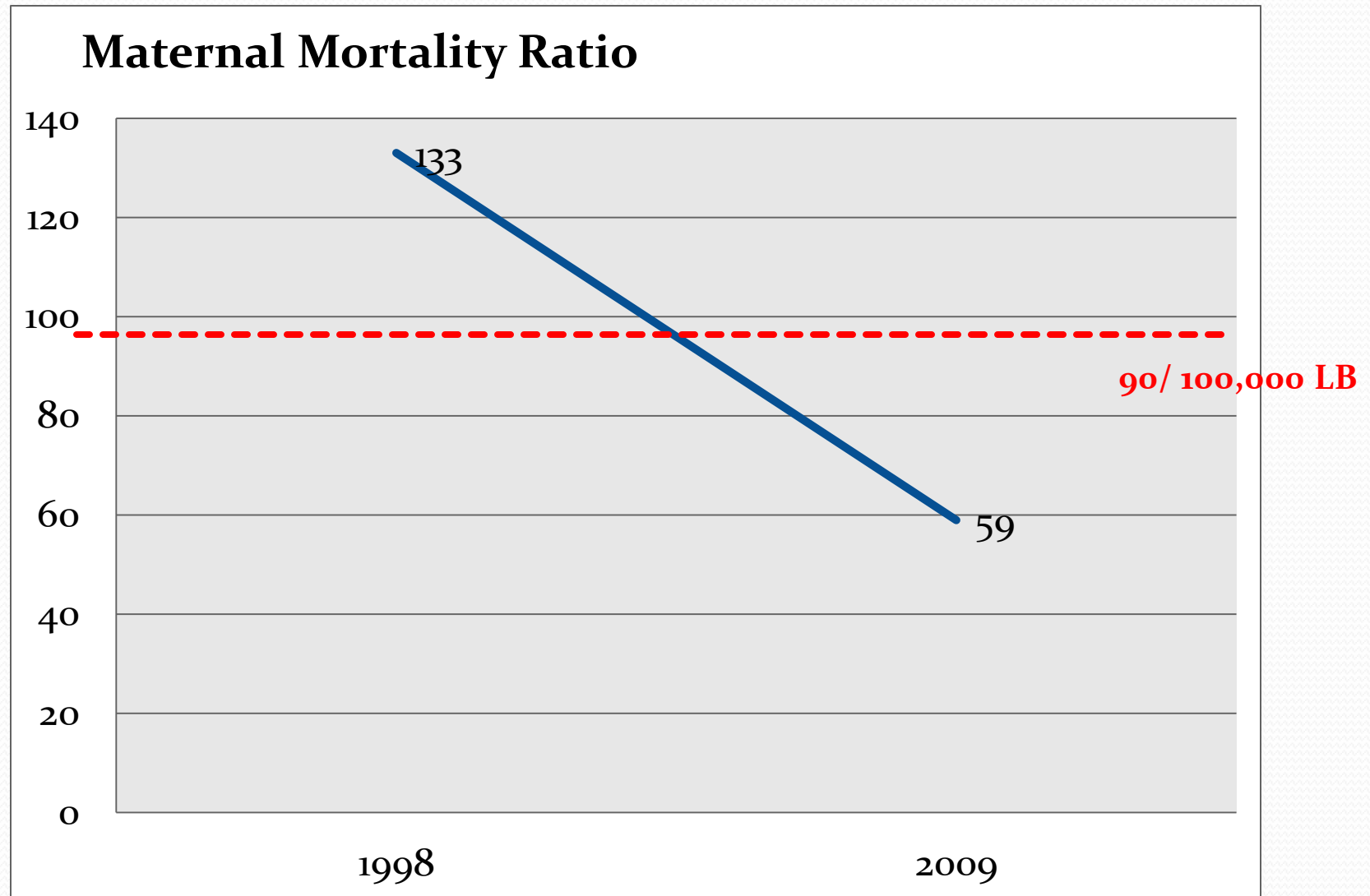


Achievements on MDG, 2009

Cohort Survival for High School

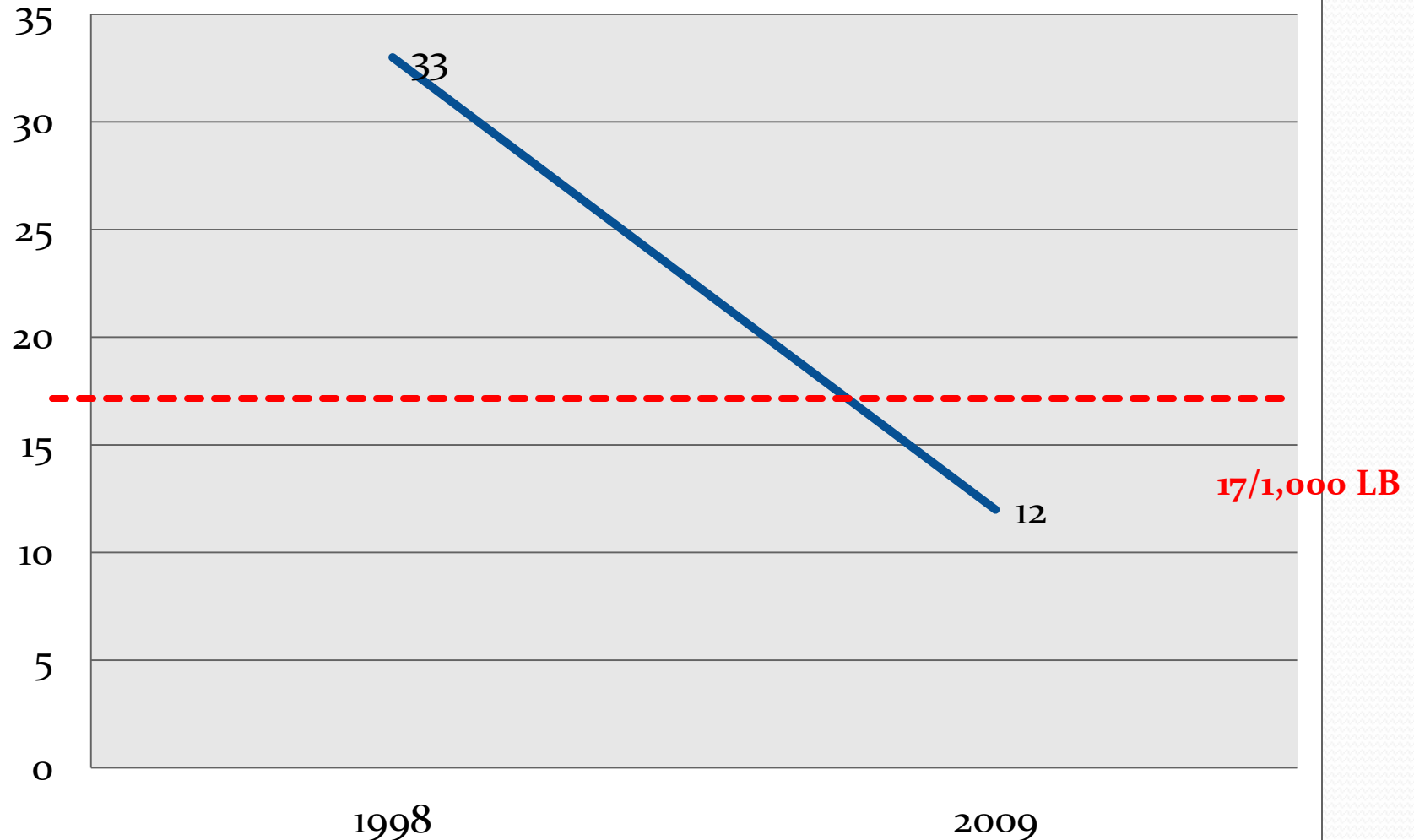


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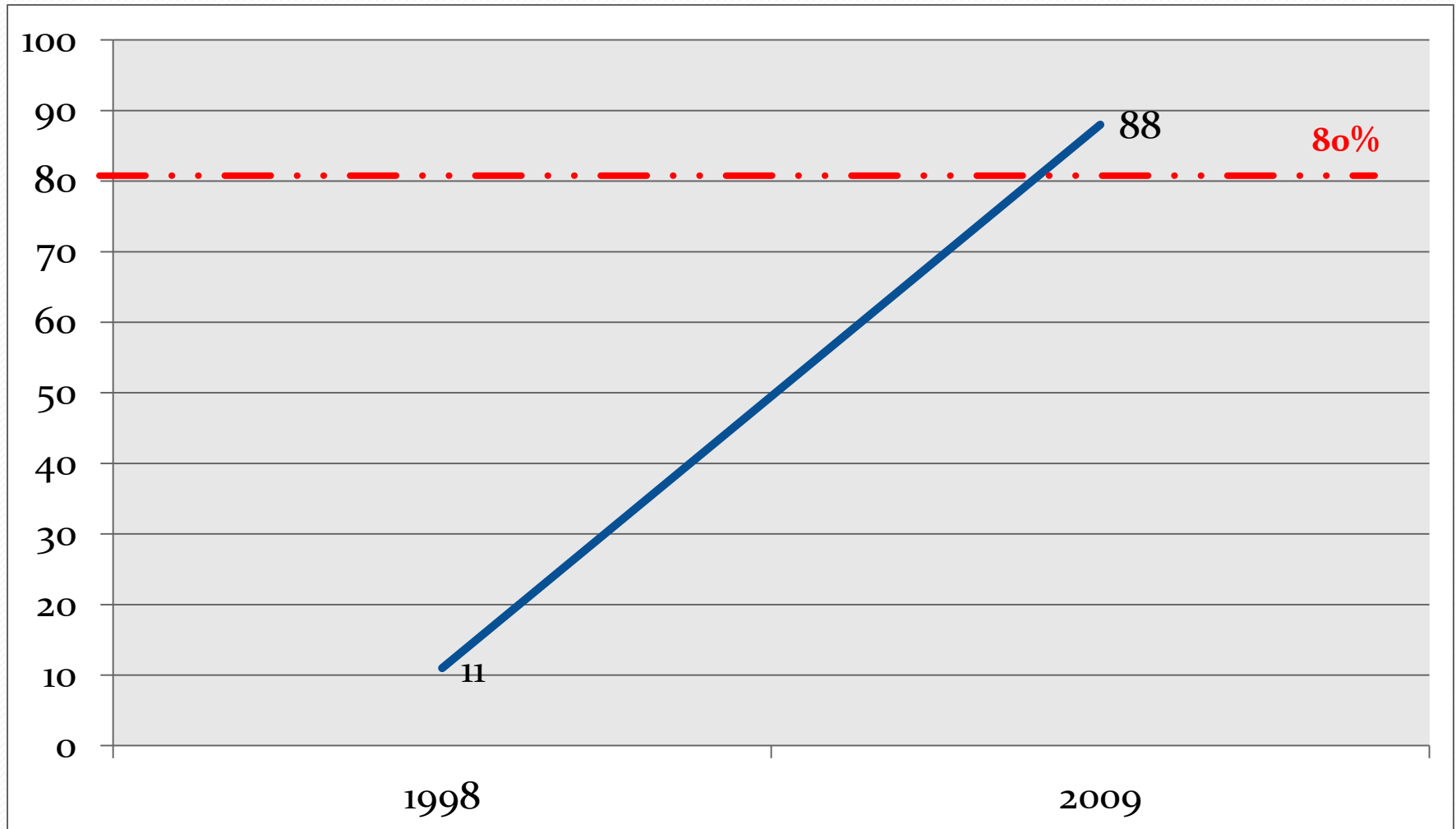
Achievements on MDG, 2009

Infant Mortality Rate



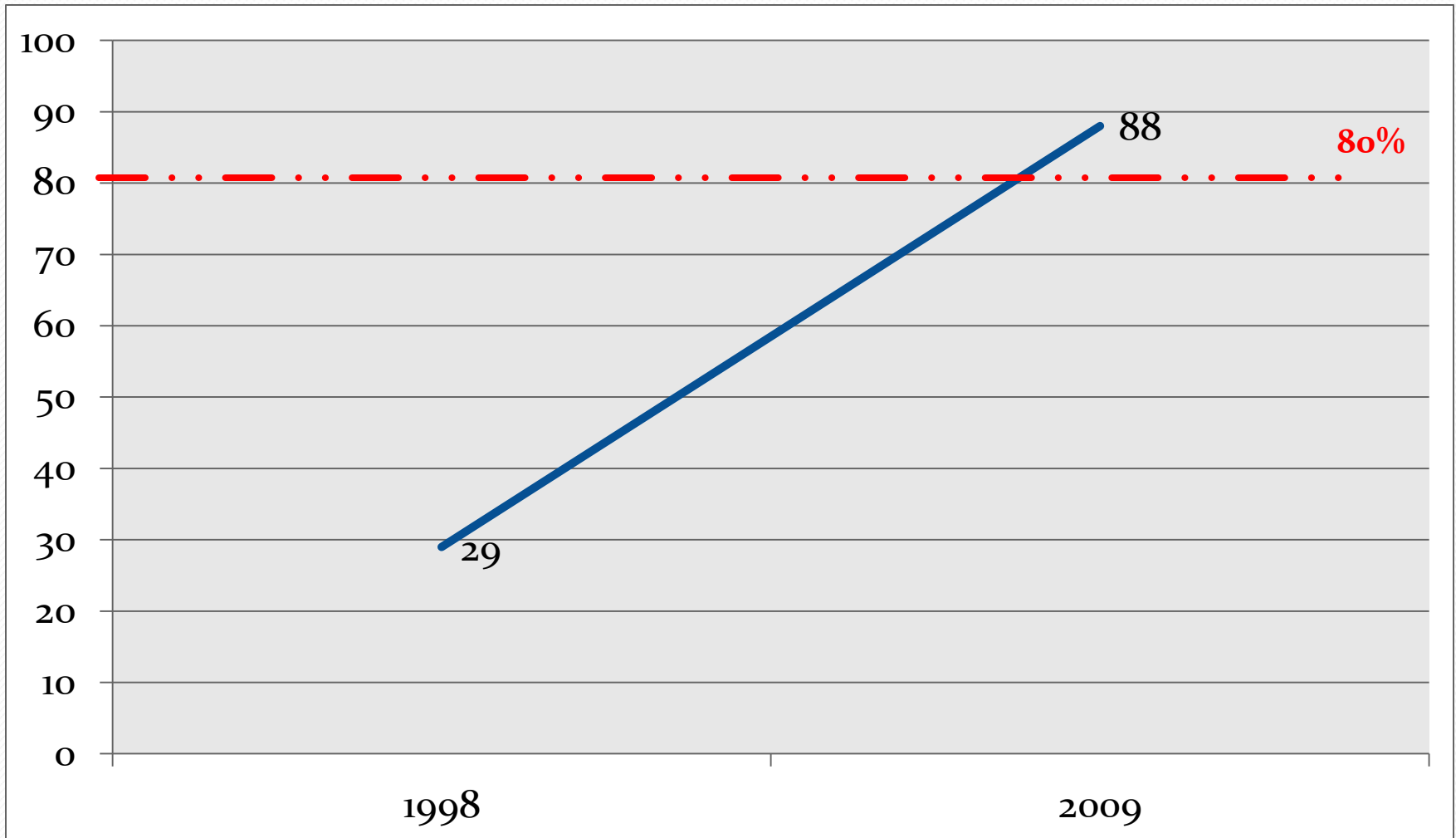
Achievements on MDG, 2009

Proportion of facility-based deliveries



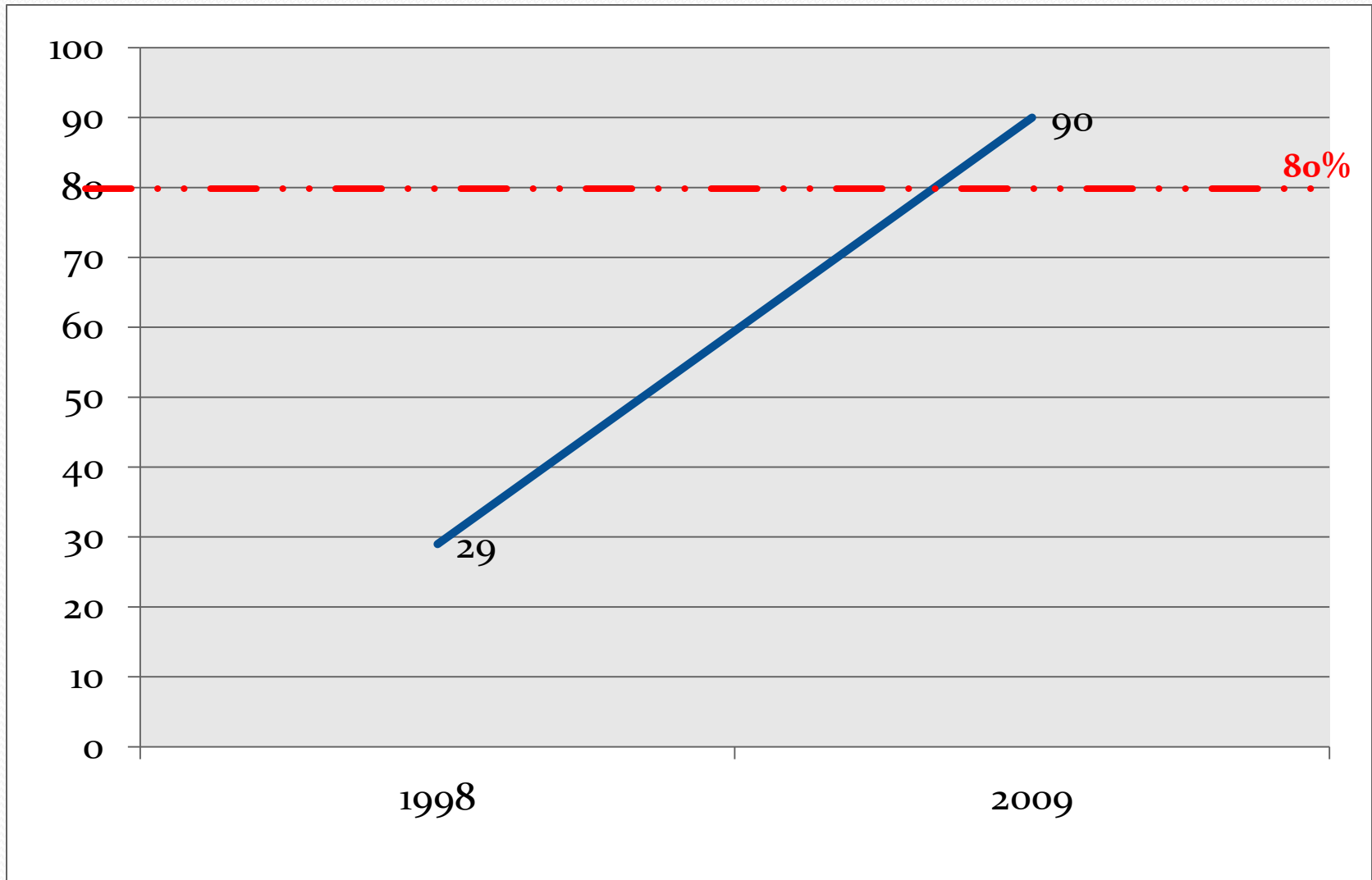
Achievements on MDG, 2009

Proportion of births attended by skilled health personnel

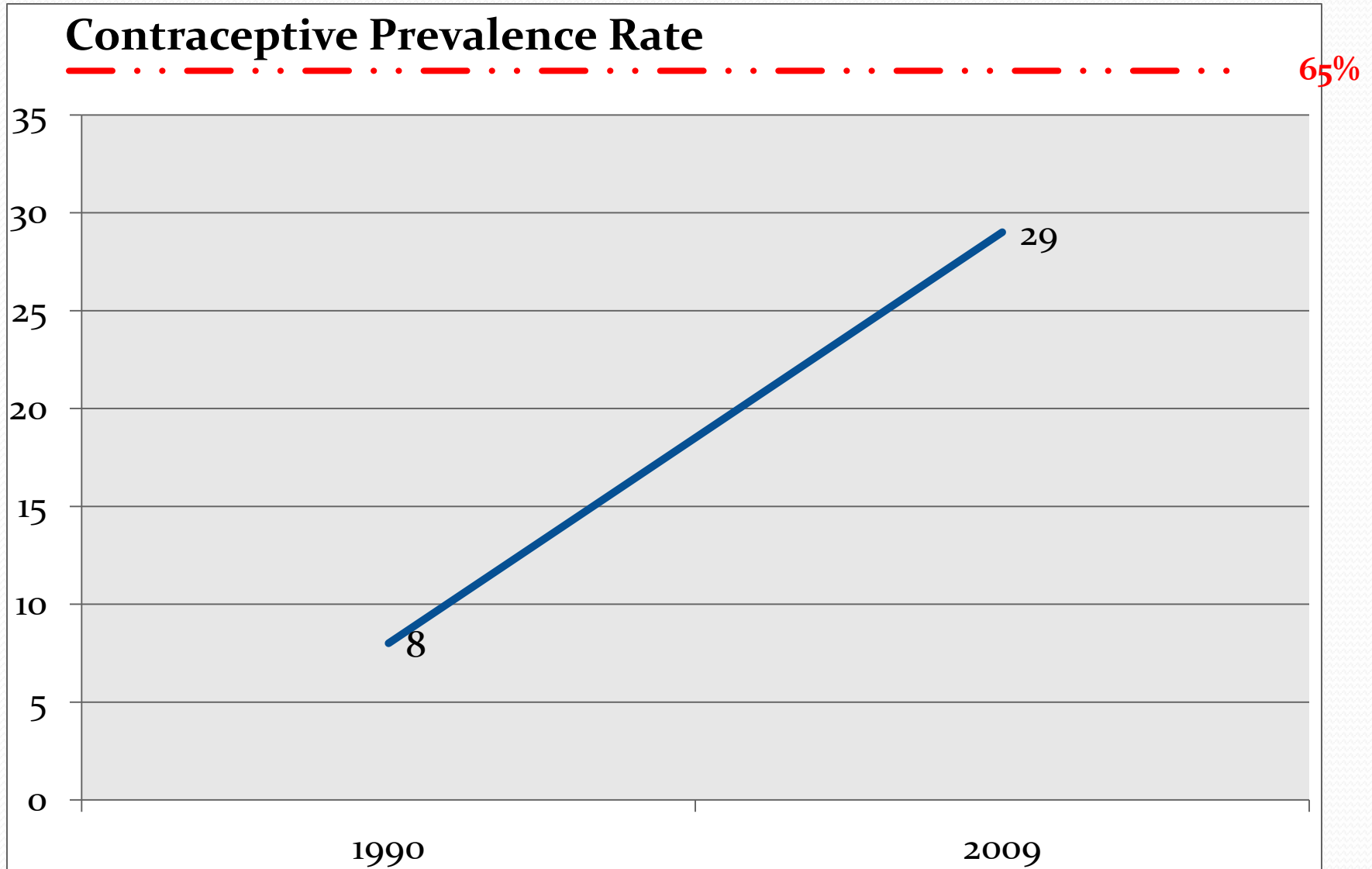


Achievements on MDG, 2009

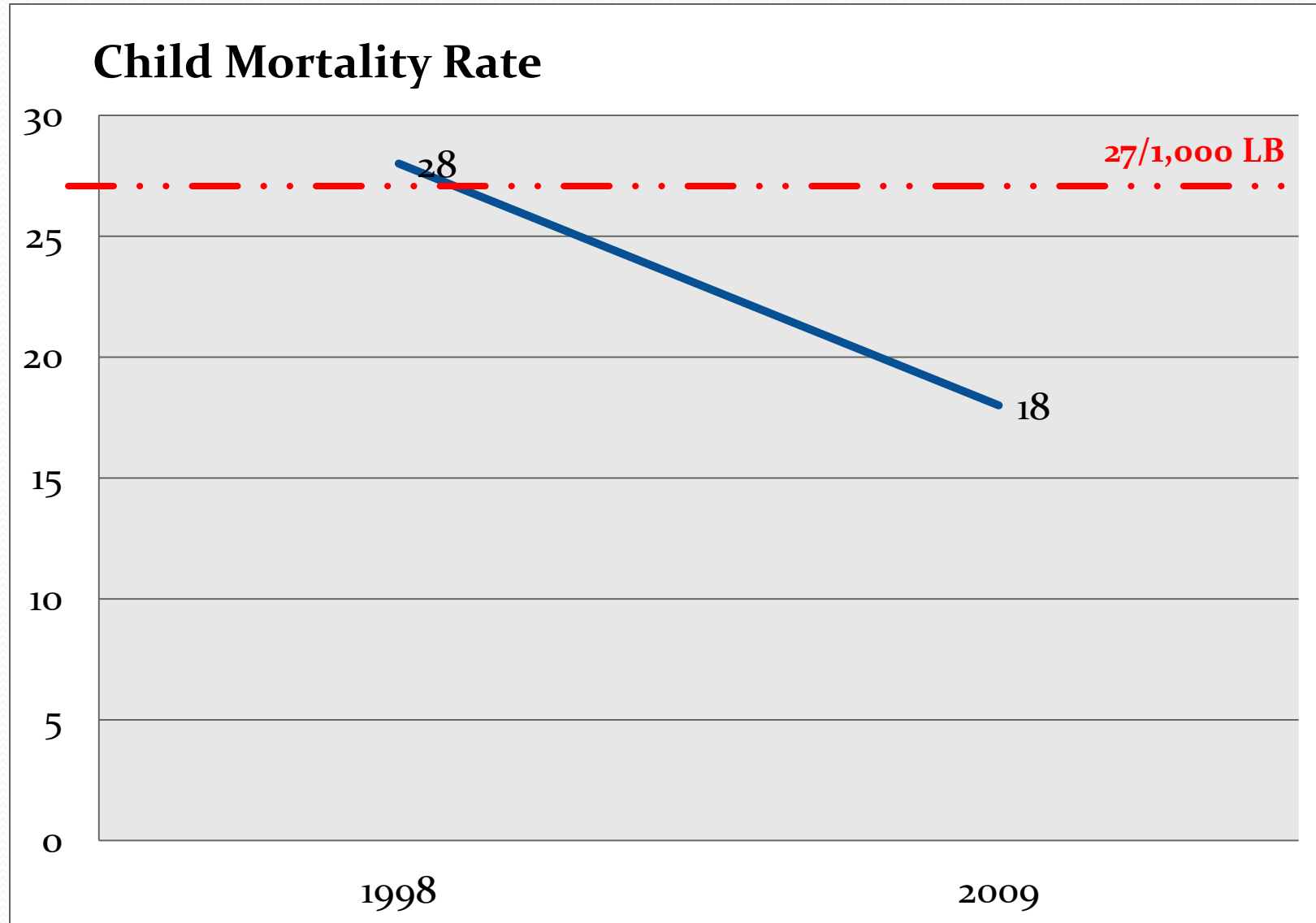
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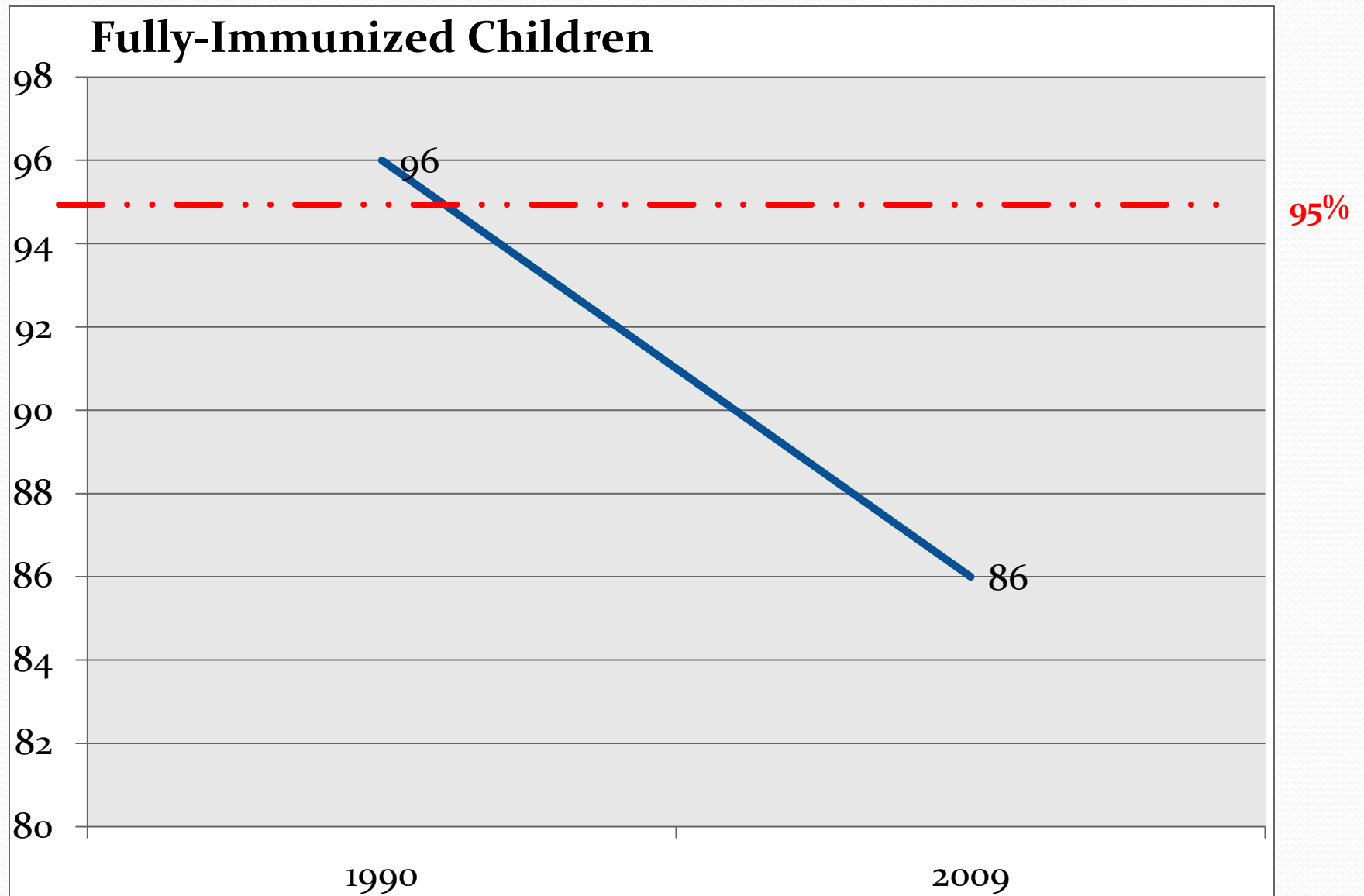
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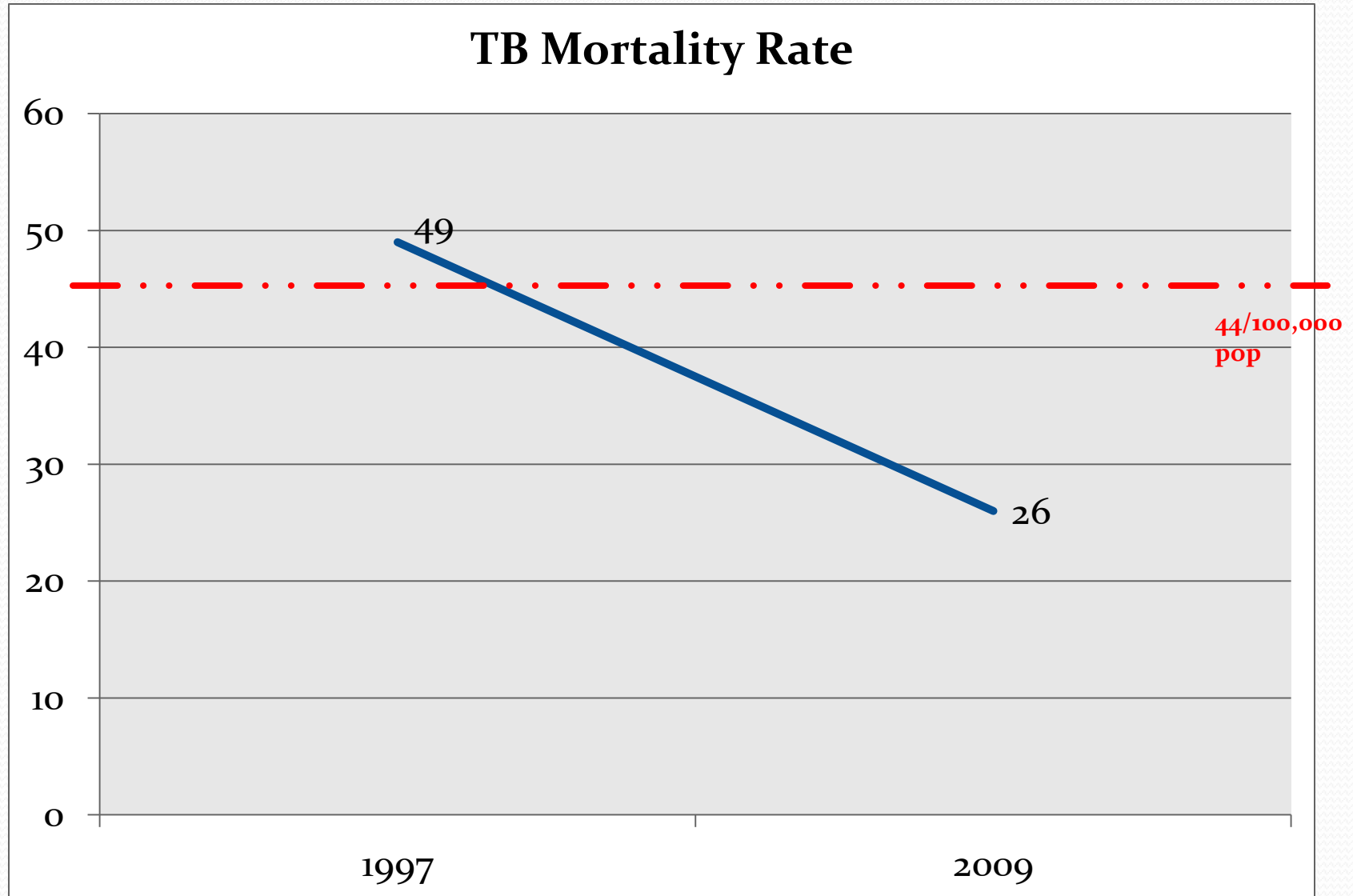
Achievements on MDG, 2009



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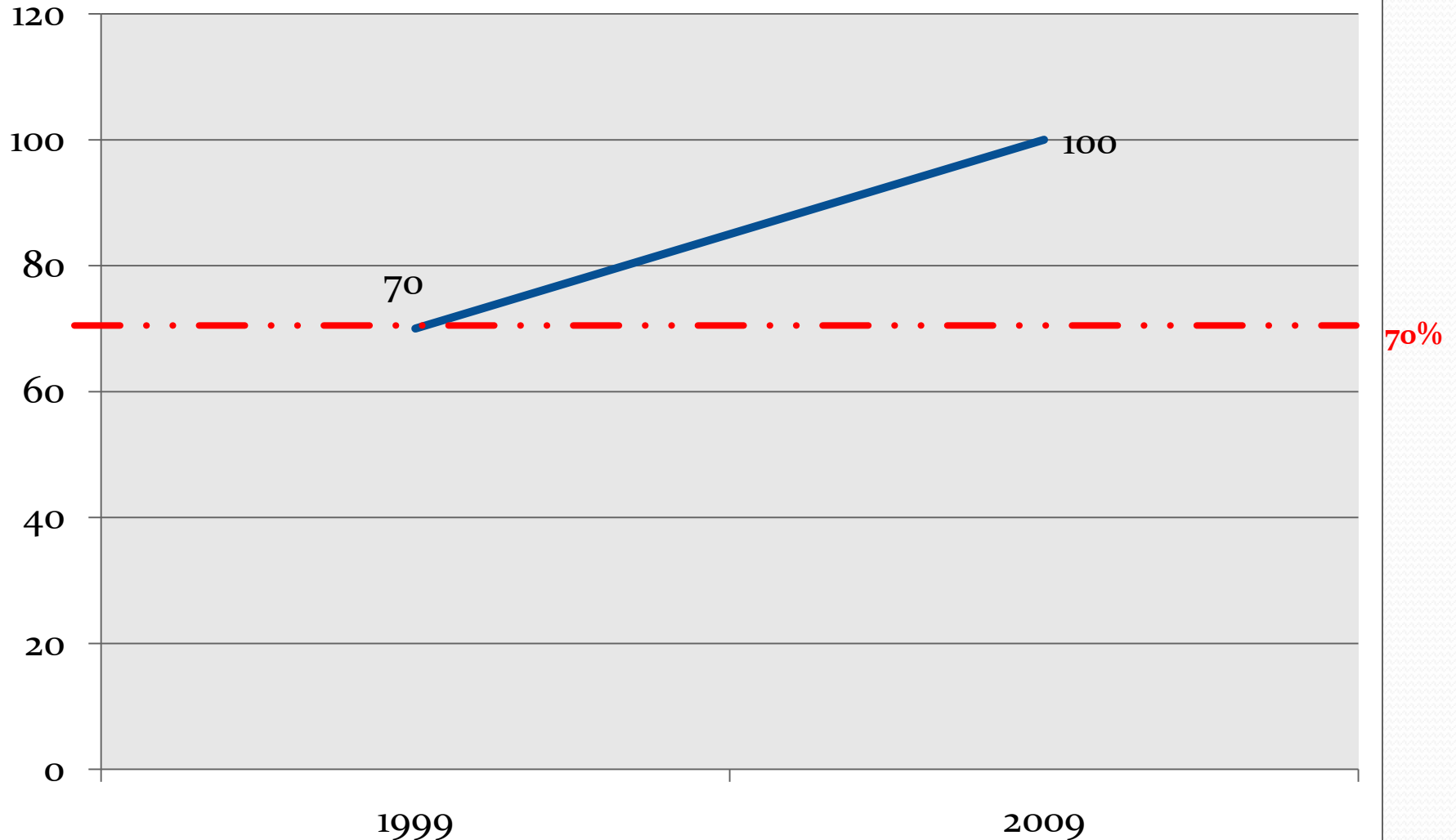


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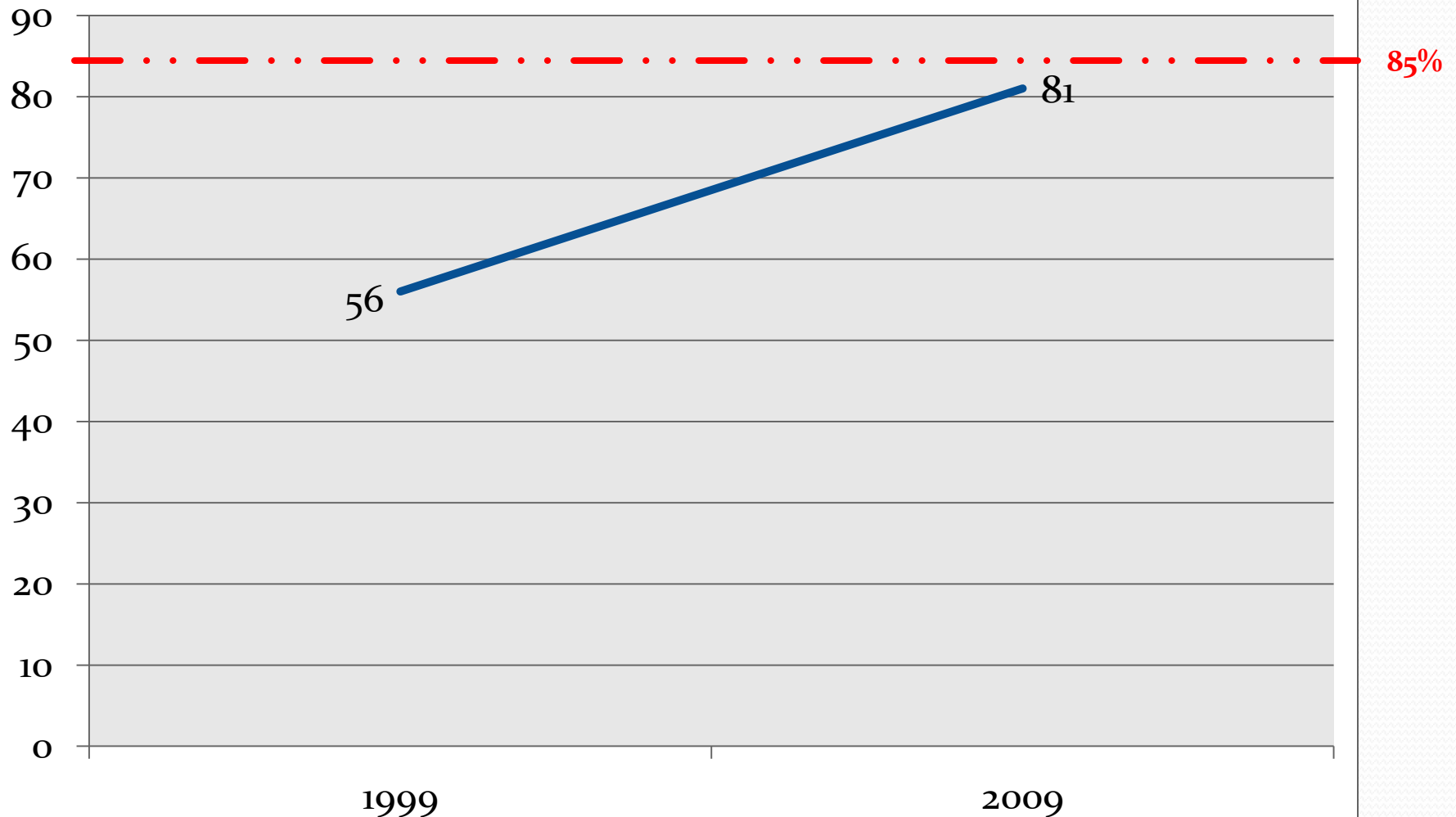
Achievements on MDG, 2009

Case Detection Rate for TB



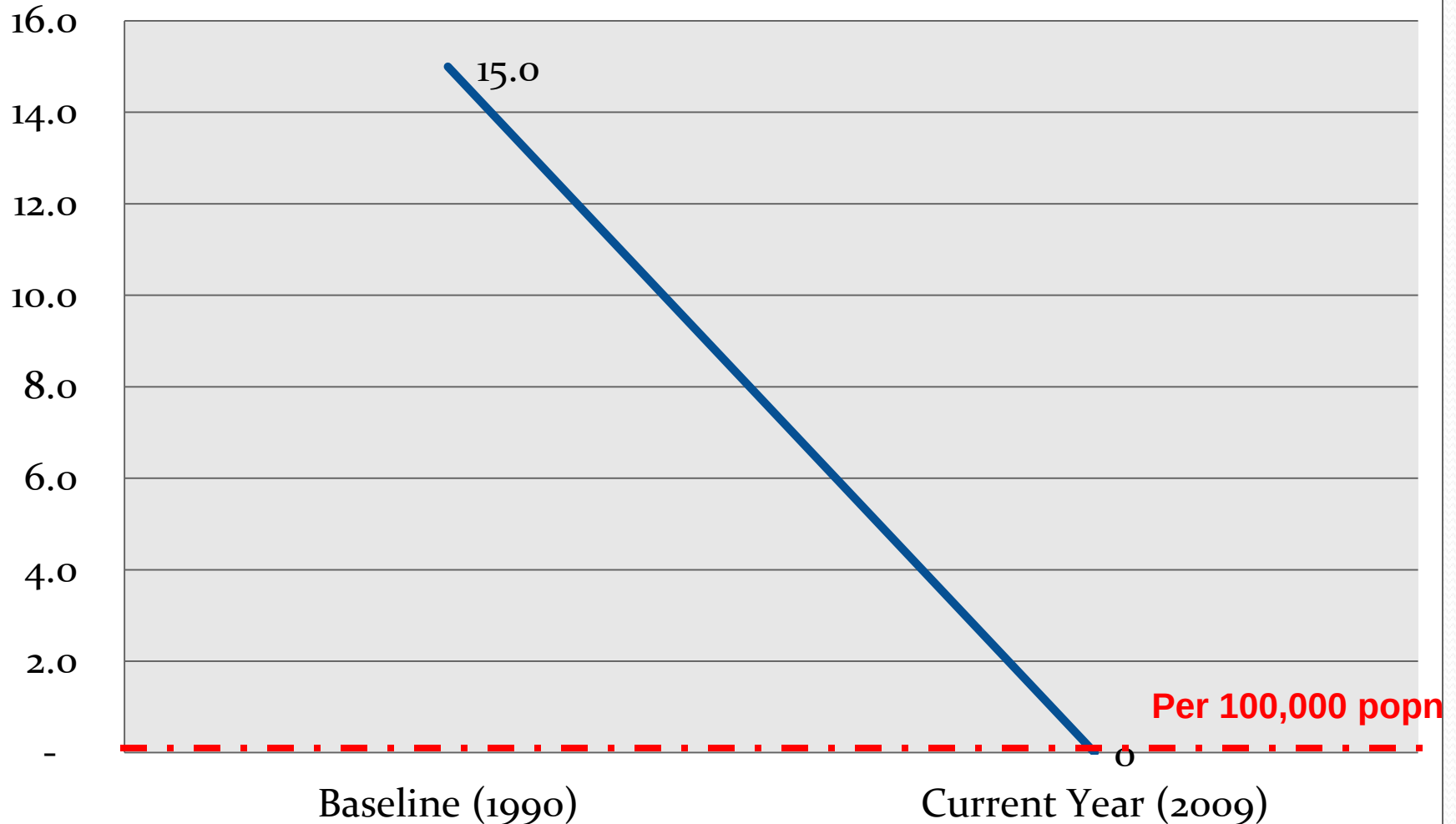
Achievements on MDG, 2009

Cure Rate for TB



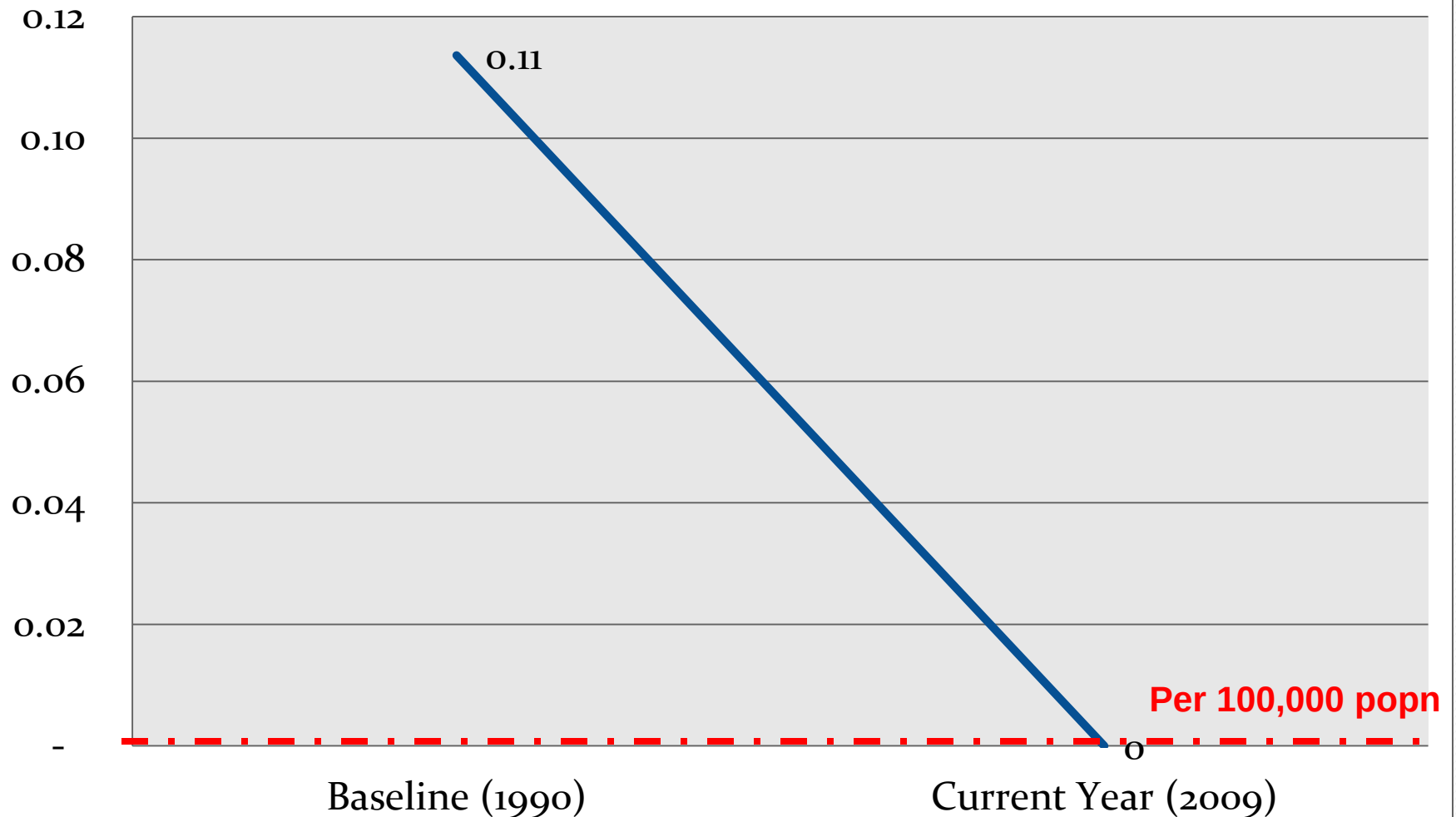
Achievements on MDG, 2009

Malaria Prevalence, Albay

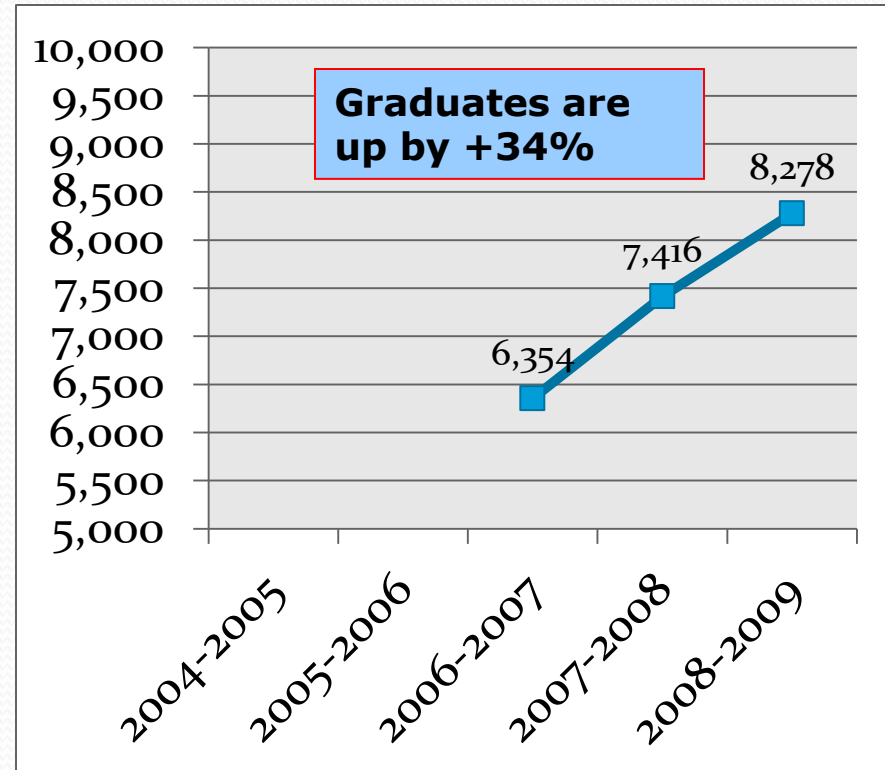
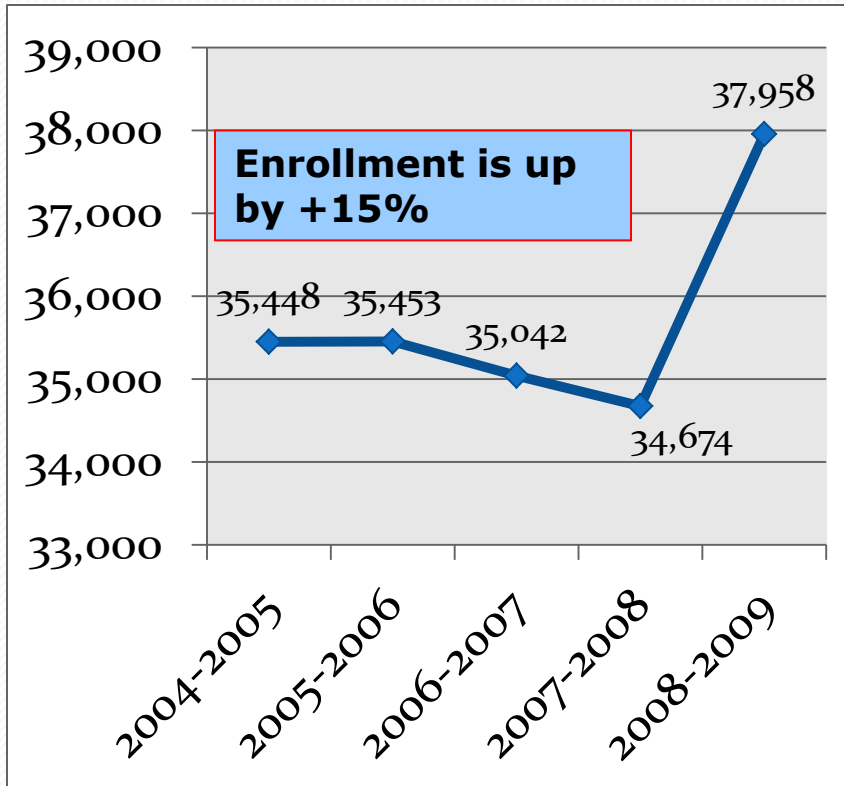


Achievements on MDG, 2009

Malaria Deaths, Albay



More kids in school, more finish school



Albay: #175 out of 202 in 2007 NAT

DIVISION	No. of Examinees	General Scholastics		Technical Vocational		Entrepreneurial Skills		Average	Rank
		Mean	Rank	Mean	Rank	Mean	Rank		
Naga City	3, 931	52.68	22	80.60	9.5	80.90	17.5	71.39	14
Legazpi City	2,813	48.07	70	75.80	57.5	78.50	44.5	67.46	58
Sorsogon City	2,520	47.61	74	75.70	60	78.60	40.5	67.30	60.5
Catanduanes	4,272	46.64	89	73.40	98.5	76.40	95	65.47	94
Iriga City	2,177	45.75	101	73.50	95	76.00	105	65.08	102
Tabaco City	2,484	45.46	106	72.50	109	76.00	105	64.65	109.5
Camarines Norte	7,413	43.06	143	71.40	121.5	75.80	111.5	63.42	127
Masbate City	1,465	44.70	120	70.40	135	74.00	135.5	63.33	130.5
Sorsogon	9,154	42.03	159	68.10	152	74.00	152	61.34	163
Ligao City	1,685	41.42	167	68.20	154.5	74.40	142.5	61.34	163
Camarines Sur	20,638	39.87	184	67.60	165	72.90	168	60.12	170
Albay	12,712	40.02	183	66.40	172	73.00	166	59.81	175
Masbate	8,150	41.40	168	64.30	180	71.90	177	59.20	179

#175 in average
#183 in scholastics

From 175th in 2007 to 64th in 2010

DIVISION	2009 MPS	Rank	DIVISION	2009 MPS	Rank	DIVISION	2009 MPS	Rank	DIVISION	2009 MPS	Rank
K02 Digos City	83.74	1	J04 Gingoog City	71.35	52	K04 Davao Oriental	65.02	103	E06 Legaspi City	58.61	154
C02 Bataan	81.87	2	C16 Muñoz Science City	71.34	53	C01 Angeles City	64.92	104	E10 Sorsogon City	58.59	155
H03 Eastern Samar	80.67	3	L01 Cotabato City	70.89	54	F13 San Carlos City	64.75	105	B07 Cauayan City	58.54	156
R01 Agusan Del Norte	80.58	4	E04 Catanduanes	70.79	55	E01 ALBAY	64.70	106	J02 Cagayan de Oro City	58.43	157
H08 Southern Leyte	80.23	5	I03 Dipolog City	70.69	56	M09 Pasig City	64.63	107	M07 Muntinlupa City	58.37	158
H06 Ormoc City	80.14	6	G16 Guihulngan	70.68	57	G08 Siquijor	64.61	108	F10 La Carlota City	58.37	159
H11 Catbalogan City	79.44	7	A04 Laoag City	70.54	58	G15 Bais City	64.36	109	L07 Kidapawan City	58.27	160
D15 Romblon	79.06	8	K03 Davao Del Norte	70.51	59	K08 Compostela Valley	64.12	110	A10 Candon City	58.09	161
D02 Batangas	78.95	9	C14 Gapan City	70.41	60	G01 Bohol	63.91	111	A09 Urdaneta City	58.08	162
D11 Oriental Mindoro	78.58	10	C06 Olongapo City	70.14	61	G18 Carcar City	63.87	112	D01 Antipolo City	58.05	163
F09 Iloilo	78.46	11	C05 Nueva Ecija	69.94	62	F08 Iloilo City	63.57	113	E03 Camarines Sur	58.02	164
H13 Baybay City	78.09	12	M08 Parañaque City	69.89	63	D13 Quezon	63.53	114	E11 Tabaco City	57.89	165
H02 Calbayog City	78.03	13	A01 Dagupan City	69.41	64	G06 Mandaue City	63.48	115	G02 Cebu	57.88	166
R09 Dinagat Island	77.92	14	J10 Tanguib City	69.39	65	F03 Bacolod City	63.29	116	B05 Quirino	57.88	167
H07 Samar (Western)	77.80	15	F06 Capiz	69.25	66	A12 San Fernando City - R1	63.23	117	A13 Vigan City	57.79	168
R07 Surigao Del Sur	76.89	16	G03 Cebu City	68.86	67	A03 Ilocos Sur	63.22	118	K01 Davao City	56.99	169
H01 Biliran	76.56	17	M05 Makati City	68.77	68	J01 Bukidnon	63.21	119	B01 Batanes	56.69	170
D18 Calapan City	76.46	18	K06 Panabo City	68.69	69	D03 Batangas City	62.97	120	G14 Bayawan City	56.65	171
H12 Borongan City	76.27	19	C03 Bulacan	68.49	70	D10 Occidental Mindoro	62.96	121	I01 Isabela City	56.64	172
D04 Cavite	76.25	20	A06 Pangasinan I	68.08	71	F02 Antique	62.85	122	M15 San Juan City	56.44	173
H10 Maasin City	76.09	21	B04 Nueva Vizcaya	68.06	72	I08 Zamboanga Sibugay	62.57	123	P07 Marawi City	56.43	174
H09 Tacloban City	76.02	22	I06 Zamboanga Del Norte	67.95	73	P10 Lamitan	62.57	124	C12 San Fernando City - R3	56.06	175
H04 Leyte	75.77	23	K05 Davao Del Sur	67.80	74	D12 Palawan	62.49	125	F16 Kabankalan City	55.61	176
G17 Bogo City	75.66	24	D17 Puerto Princesa City	67.72	75	F05 Cadiz City	62.35	126	P11 Lanao Del Sur I-B	55.29	177
R04 Siargao	75.46	25	B06 Tuguegarao City	67.65	76	J12 Valencia City	62.23	127	M02 Manila	55.07	178
K09 Island Garden City of Samal	75.40	26	C04 Cabanatuan City	67.55	77	N01 Abra	62.13	128	B03 Isabela	54.85	179
E05 Iriga City	75.38	27	G07 Negros Oriental	67.31	78	C11 San Jose Del Monte City	62.10	129	F14 Silay City	54.71	180
D07 Lipa City	75.35	28	M13 Marikina City	67.06	79	F01 Aklan	62.07	130	P04 Lanao Del Sur II-A	54.51	181
R06 Surigao Del Norte	75.21	29	I05 Zamboanga City	67.05	80	K07 Tagum City	62.00	131	P03 Lanao Del Sur I-A	54.33	182
F07 Guimaras	75.18	30	G10 Tanjay City	66.97	81	F17 Passi City	61.85	132	F11 Negros Occidental	54.06	183
C17 Malolos City	75.07	31	M12 Las Piñas City	66.93	82	J05 Misamis Occidental	61.67	133	K10 Mati City	54.01	184
H05 Northern Samar	74.97	32	A11 Alaminos City	66.84	83	G04 Dumaguete City	61.60	134	F12 Roxas City	53.88	185
R08 Bislig City	74.75	33	A08 San Carlos City	66.73	84	C10 Aurora	61.55	135	G05 Lapu-Lapu City	53.58	186
C15 Balanga City	74.67	34	E02 Camarines Norte	66.50	85	C13 Tarlac City	61.46	136	E08 Naga City - R5	53.14	187
I02 Dapitan City	74.18	35	E07 Masbate	66.31	86	L03 Sarangani	61.40	137	N02 Baguio City	52.88	188
C08 Tarlac	73.97	36	L02 General Santos City	65.94	87	N06 Mountain Province	61.27	138	B08 Santiago City	52.72	189
G13 Danao City	73.58	37	C09 Zambales	65.90	88	N03 Benguet	61.25	139	D19 Calamba City	52.29	190
A02 Ilocos Norte	73.42	38	I07 Zamboanga Del Sur	65.89	89	M11 Taguig / Pateros	61.23	140	D06 Laguna	52.05	191
R03 Butuan City	73.36	39	I04 Pagadian City	65.88	90	E13 Masbate City	61.04	141	M01 Caloocan City	51.06	192
R02 Agusan Del Sur	73.19	40	M14 Valenzuela City	65.80	91	M03 Pasay City	60.93	142	F04 Bago City	50.78	193
A07 Pangasinan II	73.07	41	N07 Apayao	65.72	92	G11 Tagbilaran City	60.84	143	G12 Talisay City	50.31	194
D09 Marinduque	72.97	42	G09 Toledo City	65.63	93	C07 Pampanga	60.54	144	P06 Basilan	50.12	195
A05 La Union	72.96	43	M06 Mandaluyong City	65.62	94	E12 Ligao City	60.46	145	J09 Iligan City	49.94	196
R05 Surigao City	72.87	44	L04 Koronadal City	65.61	95	E09 Sorsogon	60.45	146	F15 Sagay City	49.00	197
J06 Misamis Oriental	72.84	45	D08 Lucena City	65.49	96	D05 Cavite City	60.25	147	G19 Naga City - R7	47.71	198
D20 Tanauan City	72.79	46	D14 Rizal	65.45	97	D21 Sta. Rosa City	60.17	148	P09 Shariff Kabunsuan	47.09	199
M04 Quezon City	72.54	47	J08 Lanao Del Norte	65.43	98	L06 Sultan Kudarat	60.13	149	P05 Maguindanao	44.70	200
L05 North Cotabato	72.38	48	B02 Cagayan	65.42	99	M10 Malabon / Navotas	59.11	150	P08 Sulu II	42.28	201
J07 Ozamis City	72.09	49	N04 Ifugao	65.33	100	D16 San Pablo City	59.09	151	P12 Lanao Del Sur II-B	40.68	202
L09 Tacurong City	71.70	50	L08 South Cotabato	65.29	101	A14 Batac City	58.71	152	P01 Sulu I	39.76	203
J03 Camiguin	71.46	51	J11 Oroquieta City	65.14	102	N05 Kalinga	58.67	153	P02 Tawi-Tawi	39.08	204

Notes on color:

Cluster 1: **Large** Size Divisions (includes representative samples of private schools)

Cluster 2: **Medium** Size Divisions (includes representative samples of private schools)

Cluster 3: **Small** Size Divisions (includes representative samples of private schools)

Recognition to Albay DRR



Adaptation 101

- ☑ Shift from physical capital formation to human capital formation
- ☑ Increase camote production to fill up staple consumption gap
- ☑ Make DRR / CCA a career

2010 ALBAY PROVINCIAL BUDGET: 5% earmarked for INFRA

Item of Expenditure	Amount	%
Personnel Services	302	38%
of which		
10% increase	27	3%
14th month + P12,000	24	3%
Regular Salaries	251	31%
Men Health PS	139	17%
MOOE	127	16%
of which		
Health MOOE	57	7%
Regular MOOE	70	9%
Jail MOOE	10	1%
Programs	337	42%
of which		
Counterpart to Bgys (P101T x 720 bgys)	73	9%
Counterpart to LGU programs (ARCDP, Kalahi)	30	4%
Scholarship	37	5%
Universal Philhealth	34	4%
Tourism Development	16	2%
CIRCA/A2C2	15	2%
Apsemo / Disaster Risk Reduction	16	2%
Calamity Fund	38	5%
Integrated Social Services	16	2%
Agricultural Production	24	3%
Other capex	38	5%
Debt Service		
Debt Servicing	38	5%
TOTAL	804	100%

The budget is the best articulation of public policy and instrument for its execution.

Highlights

- 9% of regular budget for adaptation
- 24% for health
- 2% for social services
- 3% for agriculture

Internal sources:

- IRA
- Quarrying fees

External

Capex accounts for only 5%

- UNL
- BSWM- P5m

Indicators for Palay	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Production (in Metric Tons)	107,274	142,425	124,062	104,001	131,895	131,882	155,700	179,467	156,892	148,036
Rank ¹	29	29	33	37		31	27	25	30	34
Per Capita	10.1	13.1	11.4	9.2	11.5	11.3	13.1	14.9	12.8	12.4
Rank ¹	42	43	50	55		53	49	41	51	
Area Harvested (in Hectares)	47,304	53,040	48,300	41,537	45,974	44,441	47,402	51,528	48,174	42,027
Average Yield Per Hectare	2.27	2.69	2.57	2.50	2.87	2.97	3.28	3.48	3.26	3.52
Utilization										
Seeds	3,548	3,978	3,623	3,115	3,448	3,333	3,555	3,865	3,613	3,152
Feeds and Wastes	6,973	9,258	8,064	6,760	8,573	8,572	10,121	11,665	10,199	9,622
Processed	96,753	129,189	112,375	94,126	119,874	119,977	142,024	163,937	143,081	135,262

¹ Based on ranking of provinces in the country.

Sources: Bureau of Agricultural Statistics
The Philippine Countryside in Figures - 2000, 2002, 2004, 2005, 2006 and 2007 Editions

148T mt of rice
produced or only
half of demand

Indicators for Corn	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Production (in Metric Tons)	20,484	30,787	13,323	14,467	17,318	16,440	18,553	31,629	41,791	50,217
Rank ¹	31	29	38	40	39	40	41	38	36	33
Area Harvested (in Hectares)	24,650	25,100	12,240	14,339	15,807	13,363	13,625	14,748	17,022	
Average Yield Per Hectare	0.83	1.23	1.09	1.01	1.10	1.23	1.36	2.14	2.46	2.90
Utilization (in Metric Tons)										
Seeds	493	502	245	287	316	267	273	295	340	346
Feeds & Waste	17,258	26,178	11,301	12,250	14,692	13,980	15,806	27,115	35,876	43,172
Processed	2,733	4,107	1,777	1,930	2,310	2,193	2,475	4,219	5,575	6,699

¹ Based on ranking of provinces in the country.

Sources: Bureau of Agricultural Statistics
The Philippine Countryside in Figures - 2000, 2002, 2004, 2005, 2006 and 2007 Editions

Type of Major Crop	2003		2004		2005		2006		2007	
	Production (in Metric Tons)	Area Harvested (in Hectares)	Production (in Metric Tons)	Area Harvested (in Hectares)	Production (in Metric Tons)	Area Harvested (in Hectares)	Production (in Metric Tons)	Area Harvested (in Hectares)	Production (in Metric Tons)	Area Harvested (in Hectares)
Abaca	1,298	4,824	1,497	5,136	1,533	5,369	1,482	5,369	1,378	5,300
Banana	13,014	1,045	12,165	1,045	12,051	1,045	11,289	967	10,772	967
Cacao	13	90	13	90	14	90	13	90	12	85
Calamansi	158	185	159	167	159	167	153	150	146	150
Coconut	207,158	41,180	172,516	41,180	183,246	41,180	178,853	41,180	144,138	40,180
Coffee	98	341	99	341	100	341	96	335	95	328
Lanzones	2	7	-	2	-	-	2	2	0	2
Mandarin	17	75	16	75	15	75	17	70	13	70
Mango	12	60	12	60	12	60	10	60	9	56
Papaya	926	116	878	119	863	119	833	103	767	103
Pineapple	1,167	105	1,128	105	1,100	100	1,006	80	992	80
Rambutan	-	-	-	3	-	3	10	3	9	3

40T hectares for coconut, the 2nd biggest crop

Source: Bureau of Agricultural Statistics

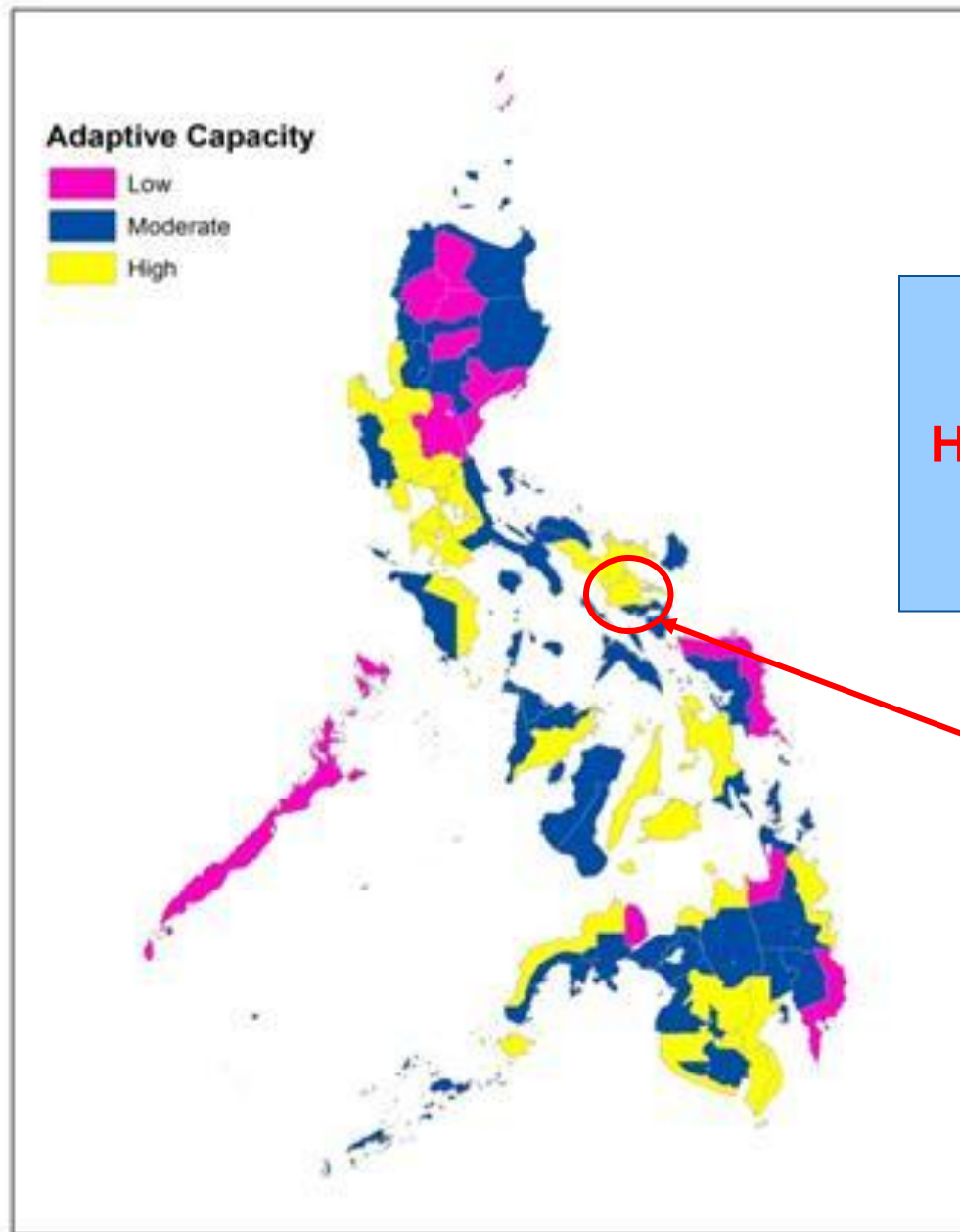
Major Temporary Crops	2003		2004		2005		2006		2007	
	Production (in Metric Tons)	Area Harvested (in Hectares)	Production (in Metric Tons)	Area Harvested (in Hectares)	Production (in Metric Tons)	Area Harvested (in Hectares)	Production (in Metric Tons)	Area Harvested (in Hectares)	Production (in Metric Tons)	Area Harvested (in Hectares)
Ampalaya	508.0	71	735.8	78	776.9	78	758.0	75	815.3	77
Cabbage	239.4	25	224.7	25	233.2	25	215.7	22	217.4	21
Camote	38,148.0	5,954	37,811.1	5,954	39,612.2	5,954	39,022.6	5,954	40,053.0	5,960
Cassava	14,348.0	1,867	14,273.3	1,877	15,115.3	1,887	14,863.1	1,887	15,153.1	1,897
Chayote	382.0	55	644.0	55	644.0	55	644.0	53	620.0	55
Eggplant	2,501.0	376	2,497.8	376	2,633.0	376	2,633.0	358	2,766.5	365
Gabi	8,644.0	934	8,445.0	934	8,688.0	934	8,688.0	920	8,777.4	925
Ginger	88.2	16	86.0	16	86.0	16	86.0	15	91.6	17
Gourd	178.0	16	656.1	30	674.0	30	674.0	29	675.3	32
Habitchuelas	282.6	74	287.7	72	304.1	72	307.1	70	313.3	75
Mongo	81.0	107	77.5	104	71.5	101	63.4	85	74.1	90
Okra	38.0	9	37.5	9	39.4	9	39.1	9	40.8	12
Peanut	639.9	837	636.1	837	662.5	837	662.4	827	675.5	833
Pepper	113.0	55	109.8	55	117.6	55	112.3	54	118.8	60
Sugarcane	68,669.5	1,060	66,768.8	1,060	68,525.3	1,060	67,800.0	1,040	60,472.7	530
Tomato	1,070.0	249	987.3	245	1,034.1	245	995.0	240	1,039.8	246
Ubi	657.1	90	612.7	81	624.0	78	580.0	75	587.0	75
Watermelon	163.9	38	157.8	38	149.5	60	144.9	30	141.0	30

40T mt of camote as substitute for rice

Source: Bureau of Agricultural Statistics

- ✓ Make MDG a goal, adaptation follows
- ✓ Ordain policies
- ✓ Give it a budget
- ✓ Execute programs and projects
- ✓ Build institutions
- ✓ Nurture partnerships / mobilize resources

THE STRATEGY



$$\text{Risk} = \frac{\text{Hazard} \times \text{Exposure}}{\text{Capacity}}$$

ADAPTATION =
Increasing
capacity so that
development can
proceed in the
midst of risks

Adaptation Strategy of Albay Province

❑ **Make MDG a goal, adaptation follows**

- Albay goal changed to “safe and shared development”
- Safe is defined as climate-proofed and disaster-proofed (HFA)
- Shared development is defined as MDG goals and HDI improvement (MDG)
- **Zero casualty goal** embodies this overall goal in the DRR context

❑ **Ordain policies:**

- Body of SP ordinances
- Incremental budget on top of calamity fund

❑ **Execute programs and projects:**

- Disaster risk reduction
- Climate adaptation
- Strategic shift to human capital formation (health and education) from physical capital formation

DRR Strategy of Albay

❑ **Build institutions**

- **Apsemo** (2008 Galing Pook awardee) - DRR
- **CIRCA** (Center for Initiatives on Research and Climate Action) – Adaptation, mitigation and IEC
- **Albay MDG Office**- Social Services/MDG

❑ **Nurture partnerships and mobilize resources**

- Continuing training with Pagasa and INGOs on climate risks
- CIRCA is a consortium of BU and EMB
- Grant from UNDP for climate integration into municipal and provincial CLUP
- Climate curriculum development with UPLB
- Mangrove planting with DENR, PNOC-EDC, coops and farmers

Vision

- ❑ Safe and shared development
- ❑ **Albay as most liveable province** known for good schools, good hospitals and good environment to secure safe and shared development
- ❑ Albayanos as healthy and happy, well-educated and well-trained people
- ❑ Low-rise, low-energy intensity = green development model

Albay Provincial Goal revised to:

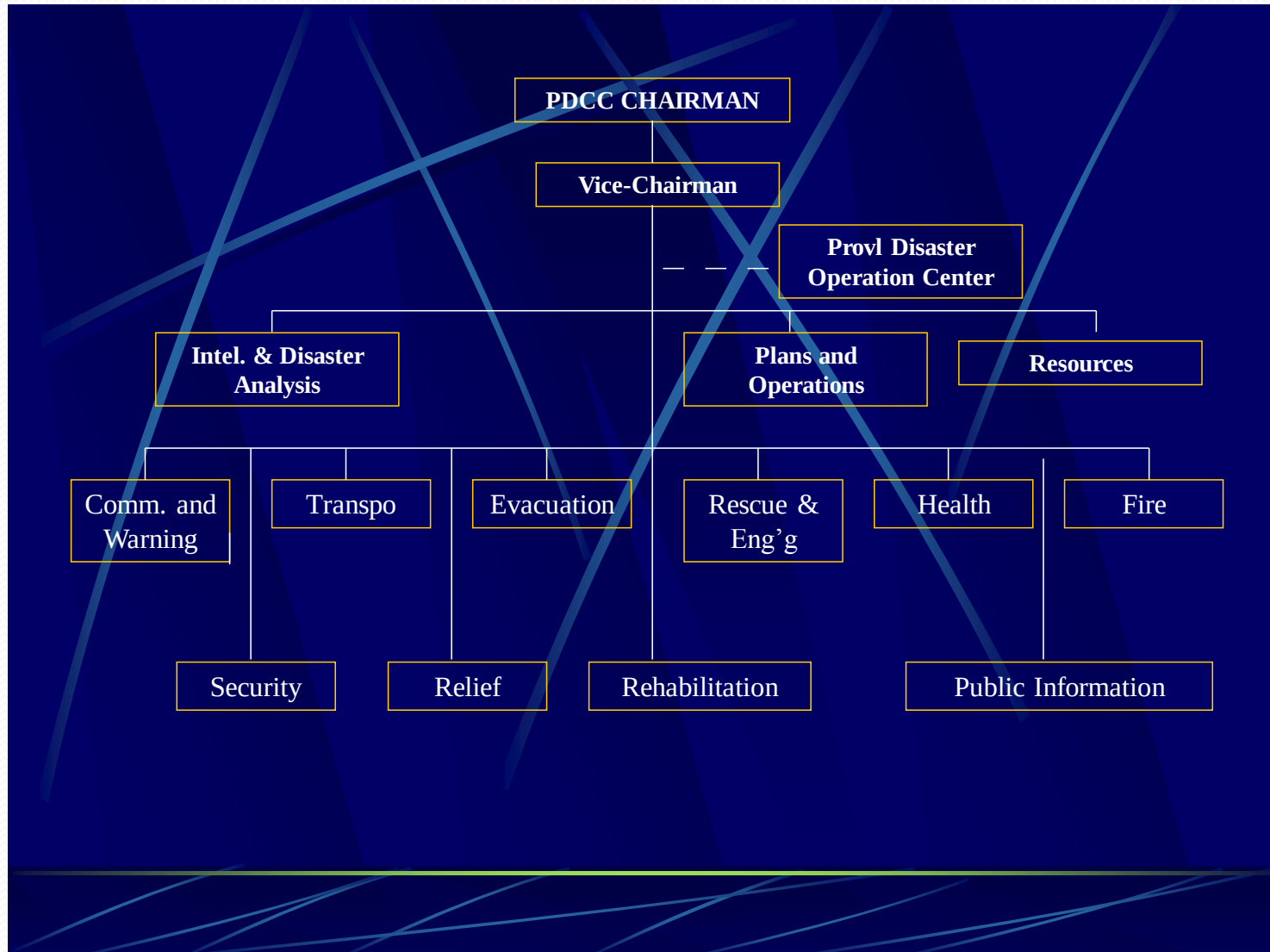
“safe and shared development”

1. Shared development operationally defined as: achieve MDG and improve HDI.
2. Safe development is defined by **climate proofing** and **disaster proofing** of **development**. Climate change and disaster risks are key obstacles to MDG and HDI.
 - a. Disaster risk reduction and climate action are built-in elements of the central economic strategy, not a contingency plan.
 - b. Disaster risk reduction is guided by Hyogo Framework for Action and climate action is guided by UNFCCC.
 - c. **Goal is Zero casualty during disaster**
3. Safe development + good governance = shared economic growth.

Resources for Institutionalized DMO

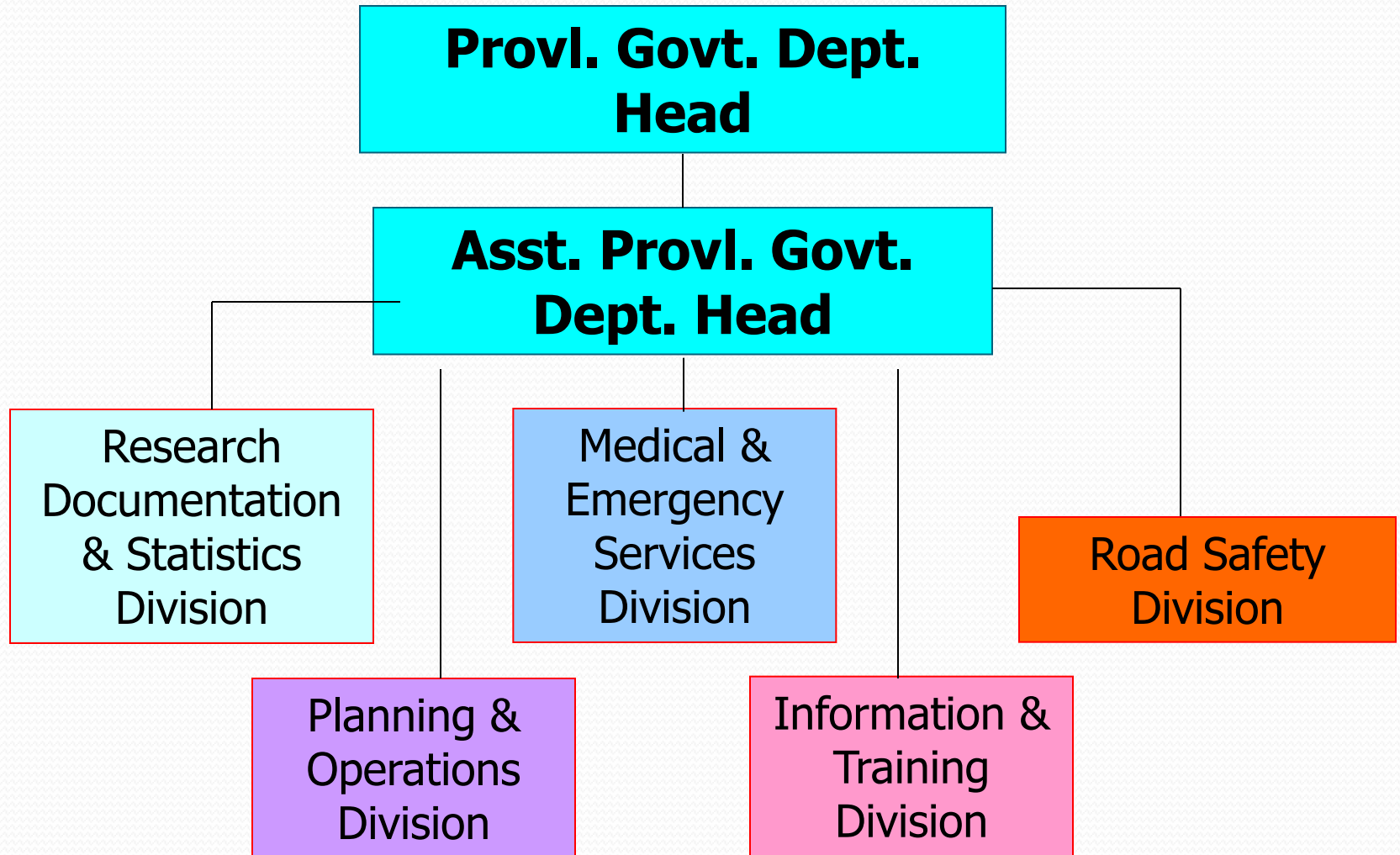
- **Permanent office: APSEMO**
 - created by ordinance in 1994 with regular plantilla of 25 including emergency research and disaster specialists.
 - has managed and survived disasters [including 7 governors!]
- **Sources of Funds**
 - Regular allocation from the annual provincial budget (IRA) separate from CF
 - Access to calamity fund for the operations 5% of IRA
 - Intermittent but steady flow of technical and logistical assistance from NG agencies, NGOs and INGOs for capacity building and skills training

Organizational Structure as a Council

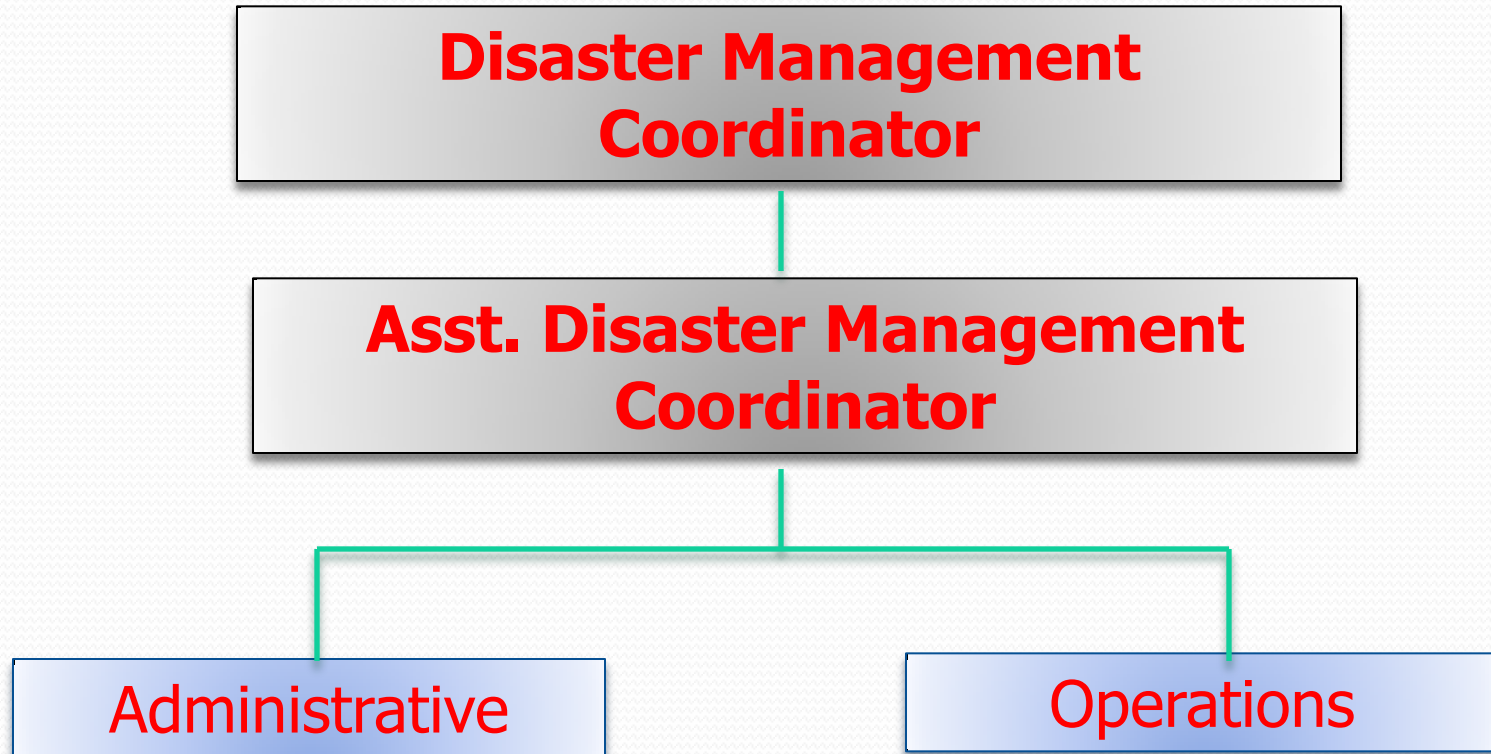


Organizational Structure as DRR Permanent Office

Albay Public Safety & Emergency Management Office

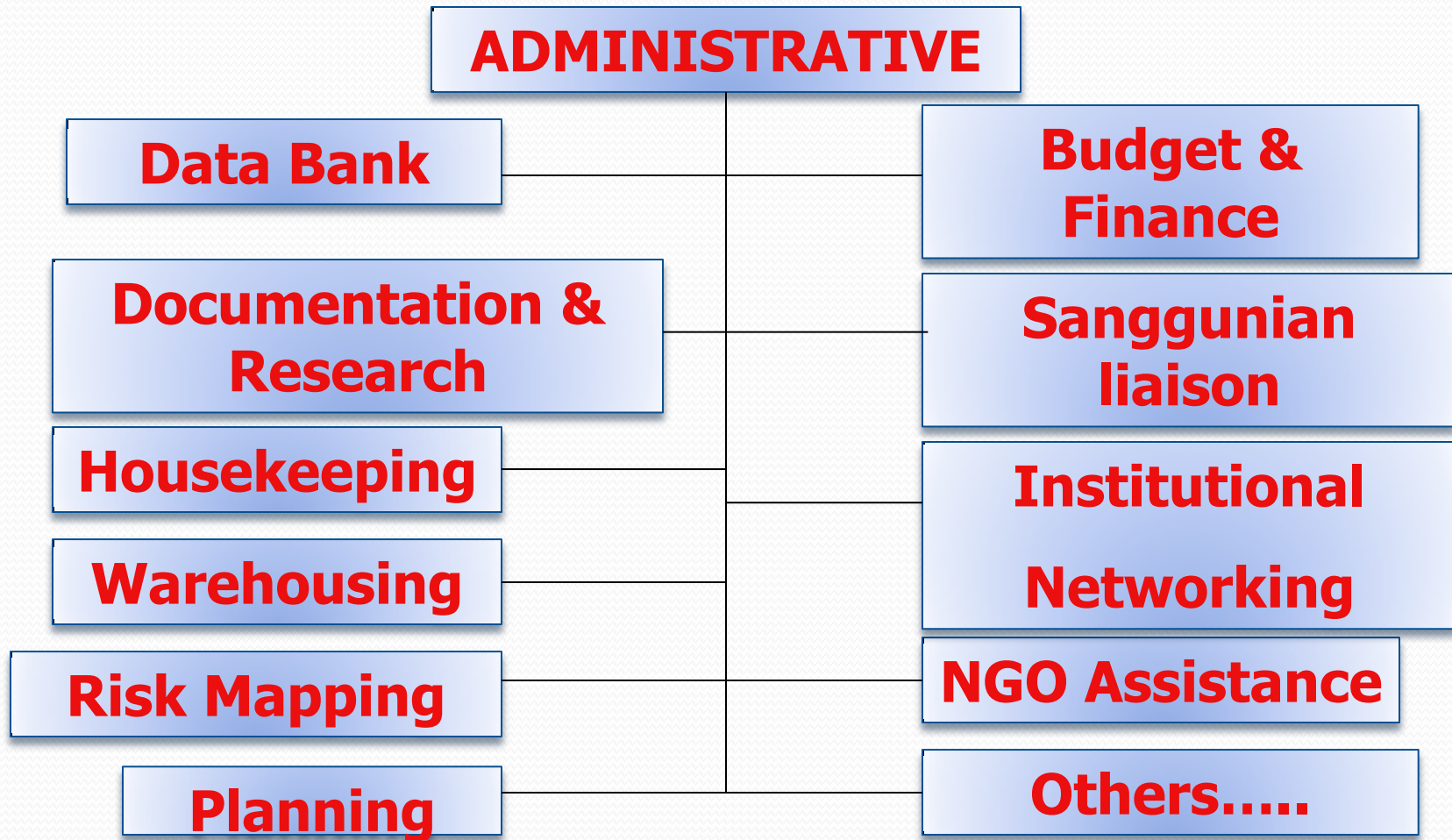


Emergency Management Structure when emergency situation is declared



Emergency Management Structure

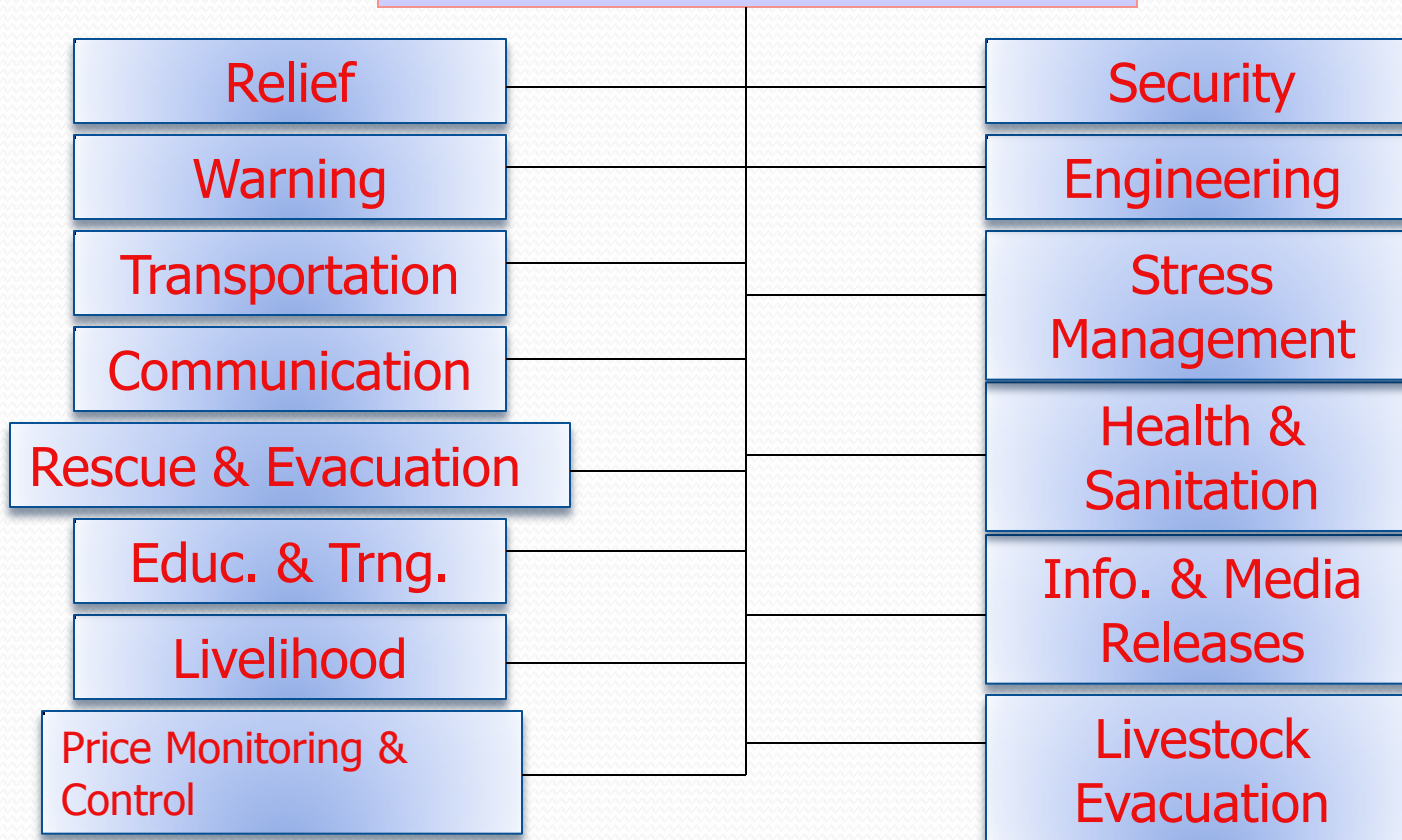
when emergency situation is declared



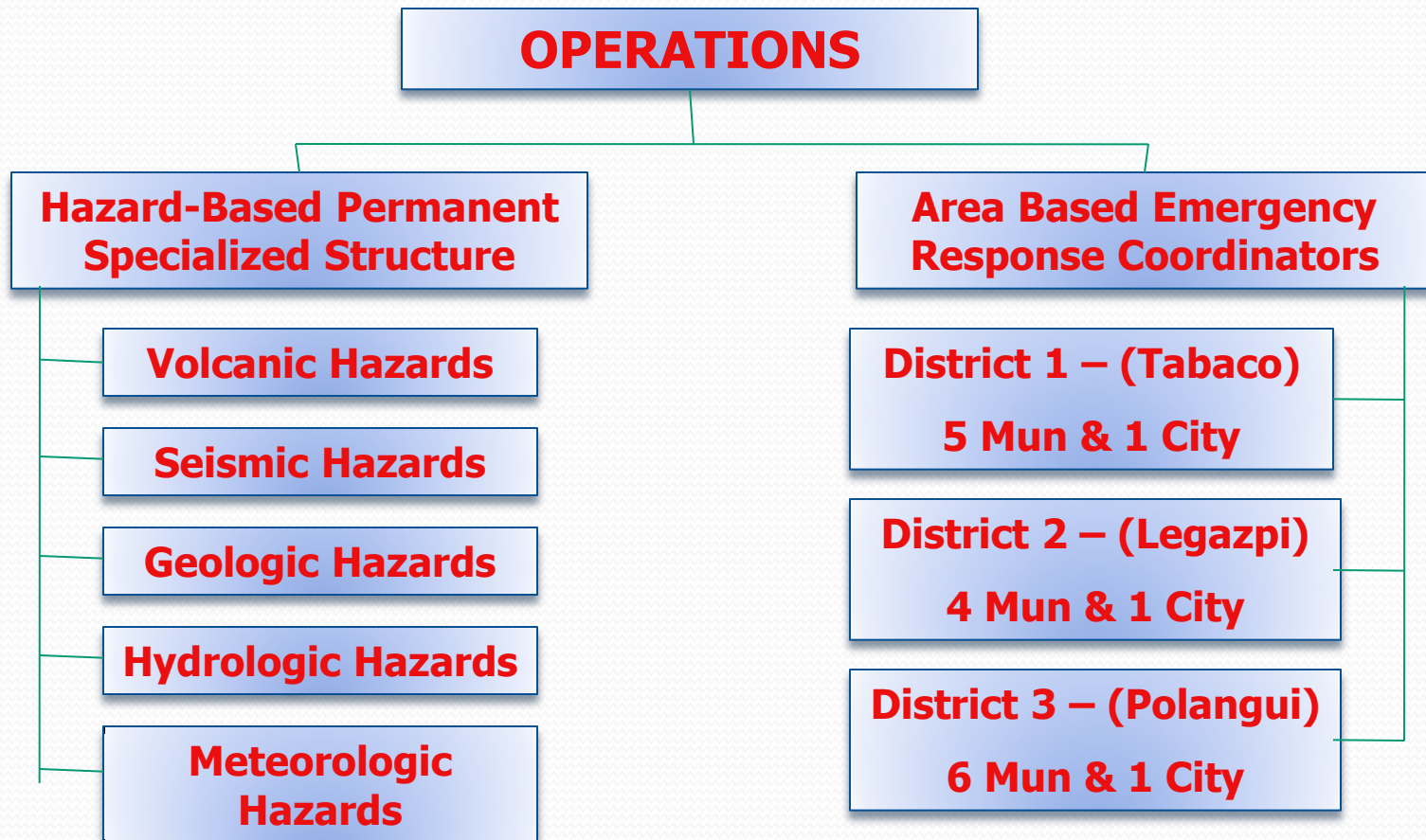
Emergency Management Structure

when emergency situation is declared

Area Based Emergency Response Functions



Emergency Management Structure (hazard and area specific)



Disaster Operation Center Facilities and Equipment

- Office spaces in 3-floor PDMO Bldg (Provincial Disaster Management Office)
- Warehouse
- Powerhouse and 3 units of power generators (5 kva, 3kva & 600 volts)
- Information room
- Conference room (70 persons capacity)
- Radio room
- Staff quarters
- Communication and documentation equipment
- GPS
- 2 vehicles (one 4x4 nissan frontier and one rescue ambulance with stretcher, spine board and emergency medical and rescue kits)

Resources for Institutionalized Climate Office

- **Program office: CIRCA**

- created by ordinance in 2007 with regular provincial budget
- Implement MDG-F JP
 - Localized climate scenario
 - climate-proof CLUP
 - Integration of climate change into curriculum (Gr 4 to 4th year)
- Advocacy and knowledge management
 - National Conference on Climate Change Adaptation (2007, 2009)
 - LGU Summit (2010)
 - Climate Change Academy
 - Disaster City
 - Climate sciences center at Bicol University

- **Sources of Funds**

- Regular allocation from the annual provincial budget (IRA)
- P16m from MDG-F JP
- Intermittent but steady flow of technical and logistical assistance from NG agencies, NGOs and INGOs for capacity building and skills training

Resources for Institutionalized MDG Office

- **Program office: AMDGO**

- created by ordinance in 2009 with regular provincial budget
- Oversight to MDG performance and secretariat to MDG Supercom
- Management MDG projects
 - Manages relocation program
 - Social assets programs esp livelihood like SEA-K, ETODA
 - CRABS or coastal and marine resources management
 - AIDS Council – HIV/AIDS advocacy

- **Sources of Funds**

- Regular allocation from the annual provincial budget (IRA)
- Intermittent but steady flow of technical and logistical assistance from NG agencies, UNDP and other UN offices, INGOs, NGOs for capacity building and skills training

Albay MDG Supercom

EXECUTIVE ORDER NO. 2009-05

CREATING THE PROVINCIAL MDG COMMITTEE IN SUPPORT TO THE MILLENIUM DEVELOPMENT GOALS

WHEREAS, In September 2000, member states of the United Nations gathered at the Millennium Summit to affirm commitments towards reducing poverty and the worst form of human deprivation;

WHEREAS, to achieve the Millennium Development Goals (MDG) member states must get additional financial resources from both domestic and external sources, formulate policies and set up an institutional environment that will ensure that the resources are used efficiently and effectively;

WHEREAS, achievement of the MDG targets largely depends on the delivery of devolved basic services by LGUs since they represent a significant portion of public expenditure decisions at the local level;

WHEREAS, meeting the requirements of the MDGs requires the efforts of major stakeholders – the national and local governments and the sector through related interventions get integrated into the local development agenda;

WHEREAS, LGUs are the primary implementers of programs, projects and activities that contribute to the achievement of MDGs;

WHEREAS, the Millennium Development Goals are measurable goals and targets that require discrimination against work that is not in line with environmental degradation;

WHEREAS, the Millennium Development Goals targets and 48 indicators as

Section 2.5 MDG Secretariat

1. Take minutes of the meetings of the MDG Committee and MDG Sub-Committees.
2. Collect and collate data from the different sub-committee of the 8 goals.
3. Prepare and submit to the MDG Committee and MDG Sub-Committee.

and submit to concerned agencies, for the realization of each particular project or

MDG Sub-Committee shall hold regular quarterly meetings by the Chairman and Sub-Committee heads

activities may be funded through internal and external sources, implementation of programs, projects and activities and auditing rules.

to take effect immediately and shall be enforce until

2009, Legazpi City, Province of Albay.


JOY SARTI SALCEDA
Governor

2009 ALBAY PROVINCIAL BUDGET: 9% earmarked for adaptation

Item of Expenditure	Amount	%
Personnel Services	302	38%
of which		
10% increase	27	3%
14th month + P12,000	24	3%
Regular Salaries	251	31%
<i>Mem. Health PS</i>	139	17%
MOOE	127	16%
of which		
Health MOOE	57	7%
Regular MOOE	70	9%
Jail MOOE	10	1%
Programs	337	42%
of which		
Counterpart to Bgys (P101T x 720 bgys)	73	9%
Counterpart to LGU programs (ARCDP, Kalahi)	30	4%
Scholarship	37	5%
Universal Philhealth	34	4%
Tourism Development	16	2%
CIRCA/A2C2	15	2%
Apsemo / Disaster Risk Reduction	16	2%
Calamity Fund	38	5%
Integrated Social Services	16	2%
Agricultural Production	24	3%
Other capex	38	5%
Debt Service		
Debt Servicing	38	5%
TOTAL	804	100%

The budget is the best articulation of public policy and instrument for its execution.

Highlights

- 9% of regular budget for adaptation
- 24% for health
- 2% for social services
- 3% for agriculture

Internal sources:

- IRA
- Royalties geothermal

External sources:

- UNDP/AECD- P16m
- BSWM- P5m

Highlights of DRR/CCA Programs

- ☐ **Integration into PDP, PDIP, AIP, PPMP**
- ☐ **Geostrategic Intervention**
- ☐ **Relocation**
- ☐ **Engineering Interventions**
- ☐ **Risk Mapping**
 - ☐ Comprehensive Land Use Plans
- ☐ **Social Preparations**
 - ☐ Community-based Warning and Evacuation Planning
 - ☐ Close coordination with Warning Agencies
- ☐ **Capacity Build-up**
 - Mobility Assets
 - Permanent Evacuation Center
- ☐ **Disaster Response**
 - ☐ Preemptive Evacuation
 - ☐ Preemptive Healthcare
- ☐ **Cluster Approach to Early Recovery**

Albay Provl Devt Investment Plan 2011-16

NAME OF PROJECT/PROGRAM	TOTAL PROJECT COST
DRR/CCA Receptive Infrastructure PPAs	
1. GUICADALE ROAD PROJECTS	2,893,657,402.71
2. SOUTHERN LUZON INTERNATIONAL AIRPORT	3,400,000,000.00
3. ALBAY WEST COAST ROAD	663,520,000.00
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SUB-TOTAL	50,585,704,202.71
Non-infra DRR/CCA Receptive PPAs	17,746,782,237.17
Non-infra/non DRR/CCA receptive PPAs	12,305,513,560.12
GRAND TOTAL	80,638,000,000.00

Risk Reduction: Geostrategic Intervention

- **Geostrategic Intervention: Guicadale Business Platform**
 - Both the flagship economic project and main DRR strategy of Albay
 - Redirection of centers of business and residential activities towards safe area
 - Components:
 - **Relocation of 10,076 households** in high-risk areas
 - Cost- P2bn for 8 resettlement sites
 - Source of Funding- NHA, province, INGOs
 - **New international airport** (ongoing)
 - Cost- P3.4bn
 - Source of Funding- DOTC national government
 - **Road networks**
 - Cost- P1.3bn
 - Source of Funding- National transfers, JICA, Multi-year from 20% economic development fund of the province/ DPWH allocations
 - **New government center**
 - Cost- P176m
 - Source of Funding- province to acquire via long term loan from Philippine Veterans Bank

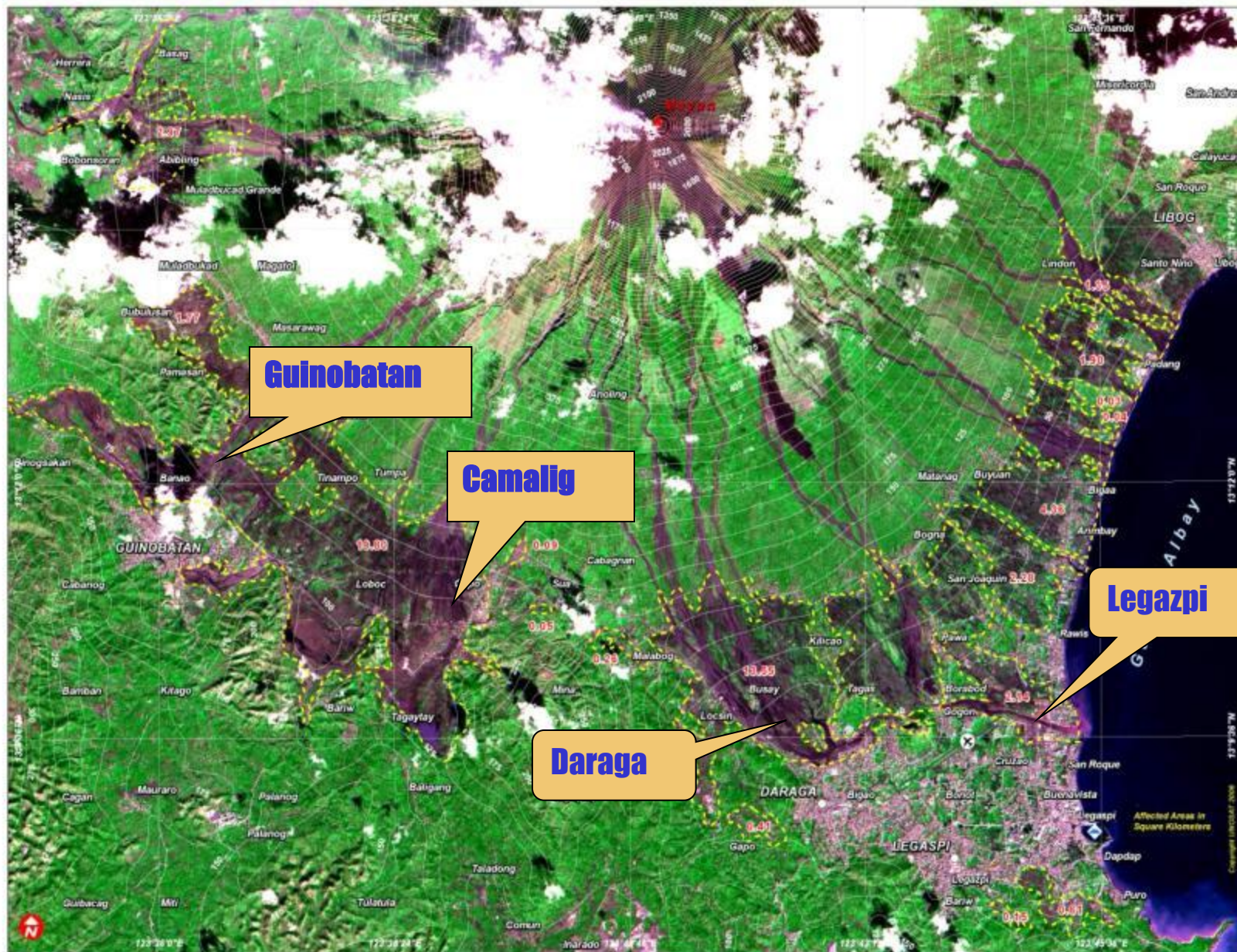
Overview of Flooding & Mudslide Damage Surrounding Mt. Mayon Volcano, Albay Province, Philippines

Satellite Identified Damage from
Typhoon Durian Using SPOT-5 Imagery
Recorded on 12 December 2006

18 December 2006

Version 1.0

Glide No: TC-2006-000175-PHL



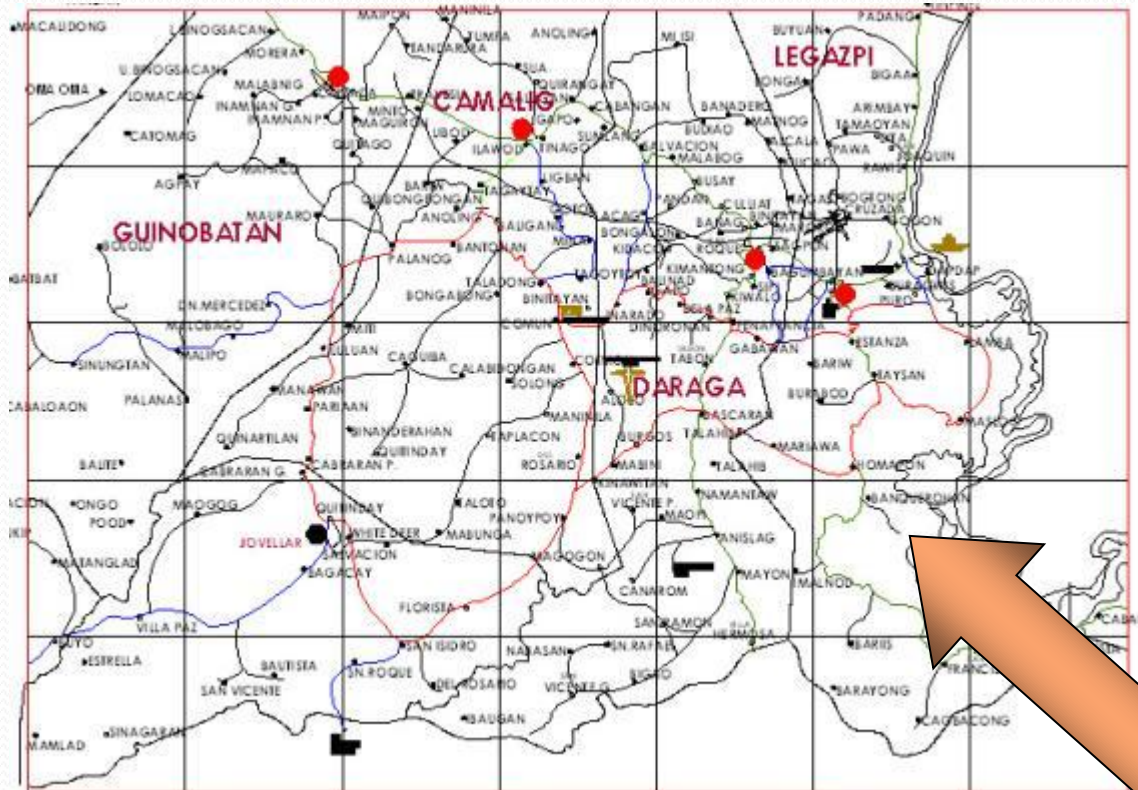
Map Information

This map illustrates the approximate areas of flooding and mudslide damage resulting from Typhoon Durian ("Reming") surrounding Mt. Mayon Volcano, Albay Province, Philippines. Damage identification has been done using SPOT-5 satellite imagery recorded on 12 December 2006 and Landsat imagery from 2002, and has not yet been validated in the field. The affected areas in square kilometers are labeled in red. The depiction and size of boundaries, geographic names and related data shown here are not warranted to be error-free nor do they imply official endorsement or acceptance by the United Nations. This map was produced by the United Nations Institute for Training and Research (UNITAR) Operational Satellite Applications Programme (UNOSAT). UNOSAT provides satellite imagery and related geographic information to UN humanitarian and development agencies and their implementing partners.

Map Legend



GUICADALE ECONOMIC PLATFORM



**DRR w/o
DISASTER**



**ECONOMIC
EXPANSION**

**DRR
MEASURES**



INVESTMENTS



Risk Reduction: Relocation

- **Relocation**

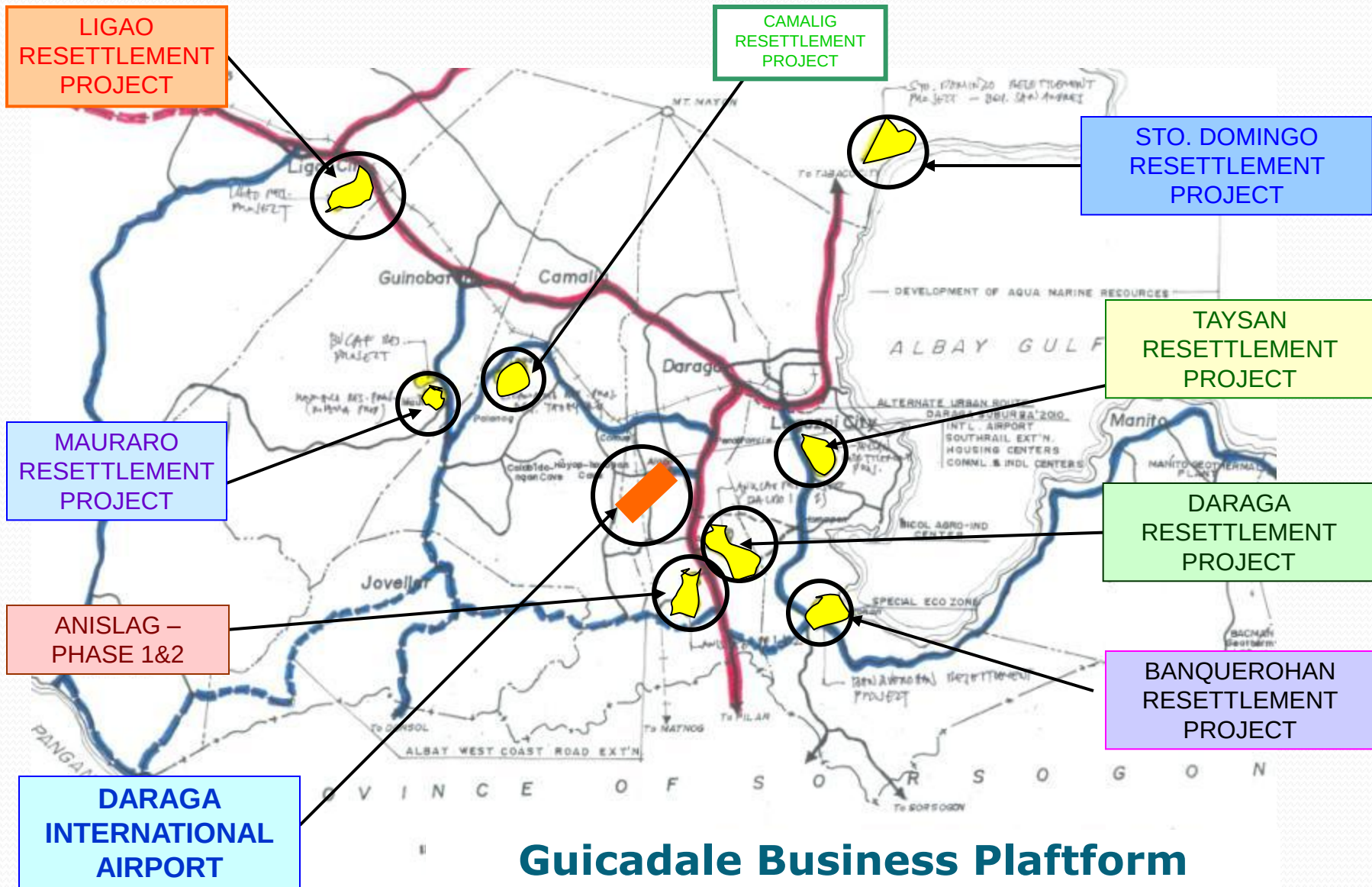
- Program being undertaken under Albay MDG Office
- 10,076 households in high risks areas already provided with developed lots in safer locations (around the new intl airport)
- Lots are already sufficient
- Shelter gap of 5,454
- Funded by NHA, DSWD, INGOs/NGOs
- Provincial Government provided the sites

Relocation



Resources for Risk Reduction: Relocation Sites

- ☐ Taysan (Legazpi City)
- ☐ Banquerohan (Legazpi City)
- ☐ Sta. Monica (Legazpi City)
- ☐ Anislag Phases 1, 2,3 (Daraga)
- ☐ Baldo 1 (Daraga)
- ☐ Baldo 2 (Daraga)
- ☐ Amore (Daraga)
- ☐ Bascaran (Daraga)
- ☐ Penafrancia (Daraga)
- ☐ Pandan (Daraga)
- ☐ Cullat (Daraga)
- ☐ Balinad (Daraga)
- ☐ Banadero (Daraga)
- ☐ Tagaytay (Camalig)
- ☐ Baligang (Camalig)
- ☐ St. Francis of Assisi (Camalig)
- ☐ Mauraro (Guinobatan)
- ☐ Quitago (Guinobatan)
- ☐ Minto (Guinobatan)
- ☐ Tuburan (Ligao)
- ☐ Lanigay (Polangui)
- ☐ San Andres phases 1 & 2 (Sto. Domingo)



Risk Reduction: Land Use Plan and Zoning

- **Comprehensive Land Use Plan**

- First line of defense against disaster: science-based adaptation
- SIMCLIM (localized climate scenario) software customized for Albay
- Training of 18 municipalities in preparation of CLUPs on integration climate risks at municipal level
- *VA / SEI analysis now complete (vulnerability assessment) / socioeconomic impacts*
- Integration of climate and disaster risks into zoning ordinance
- Source of Funds: P16m from **UNDF MDGCF**

- **Soil Analysis**

- BSWM-led soil testing of 15 LGUs with 3 already done (Polangui, Ligao and Tiwi)
- Source of Funds: P5m from **Dept of Agriculture MOOE** downloaded to Provincial Government

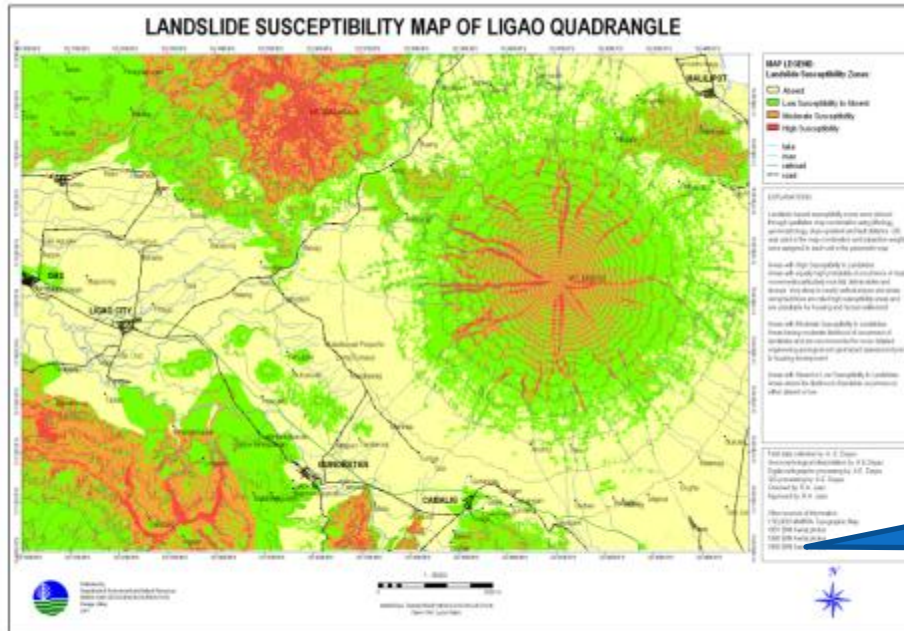
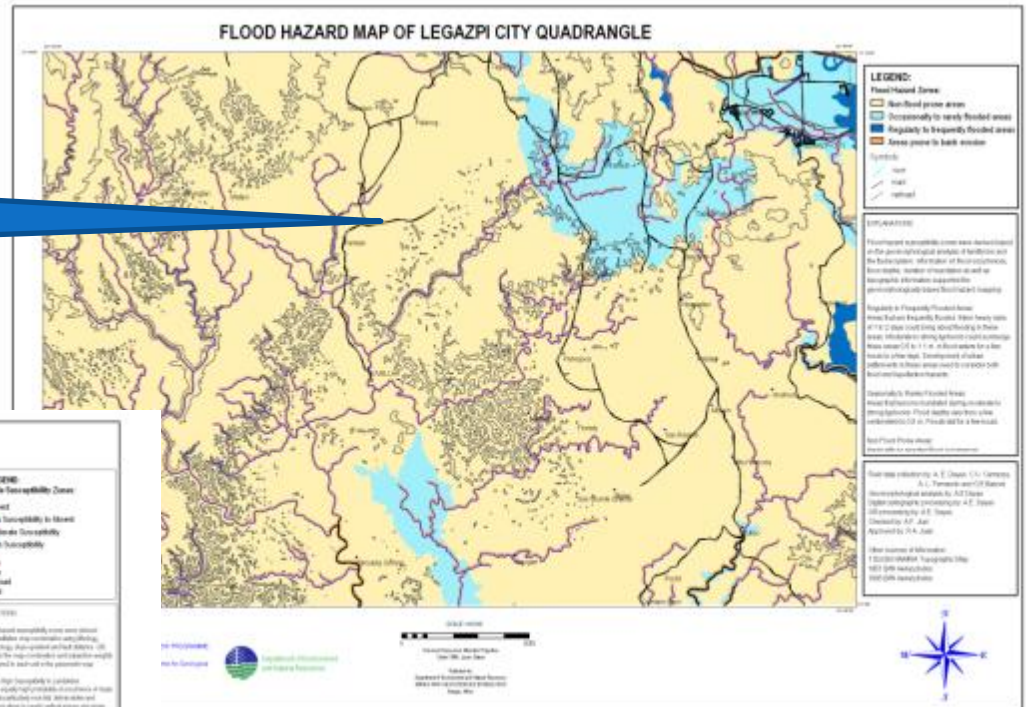
Risk Reduction: Risk Mapping

- **Risk mapping**

- Risk mapping is a common resource to all phases of DRR- risk mitigation, preparedness, damage assessment, response, relief and recovery
- Sources of Funds:
 - **PHIVOLCS**
 - Earthquake mapping
 - Volcanic Hazard Mapping
 - REDAS training for LGUs
 - Tsunami
 - **PAGASA**
 - Flood Mapping
 - **Mines and Geo-Sciences Bureau**
 - Landslide mapping
 - **Manila Observatory**
 - Mudflow (Lahar) mapping
 - **LGU**
 - Population and Resource Mapping
 - Comprehensive Land Use Plan

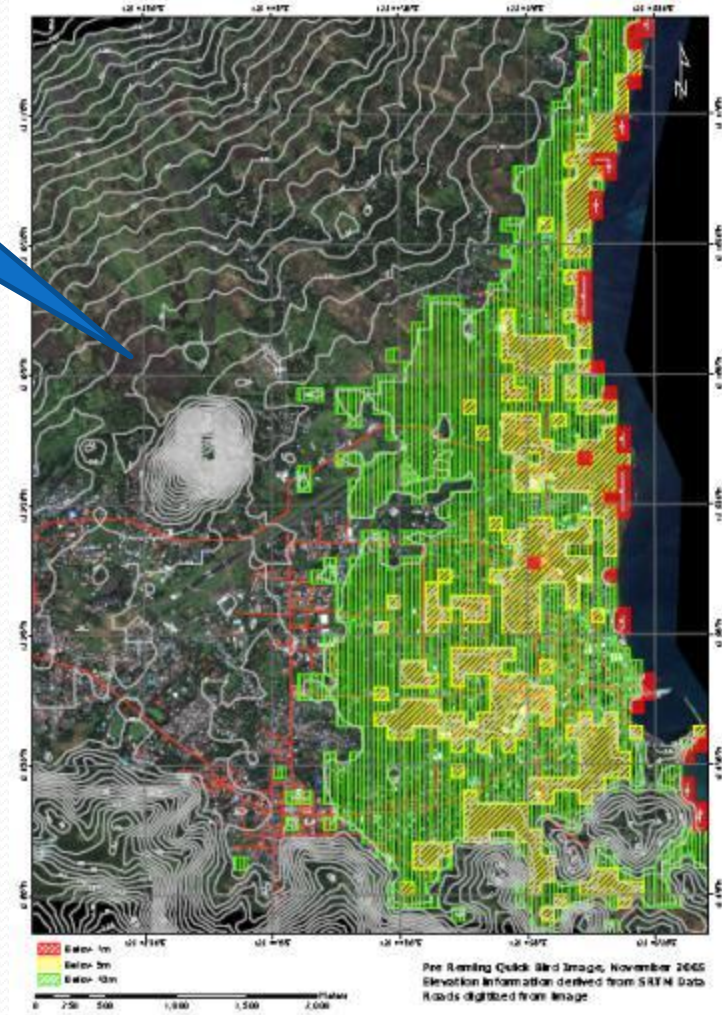
Hazard Maps

Legazpi Flood Map

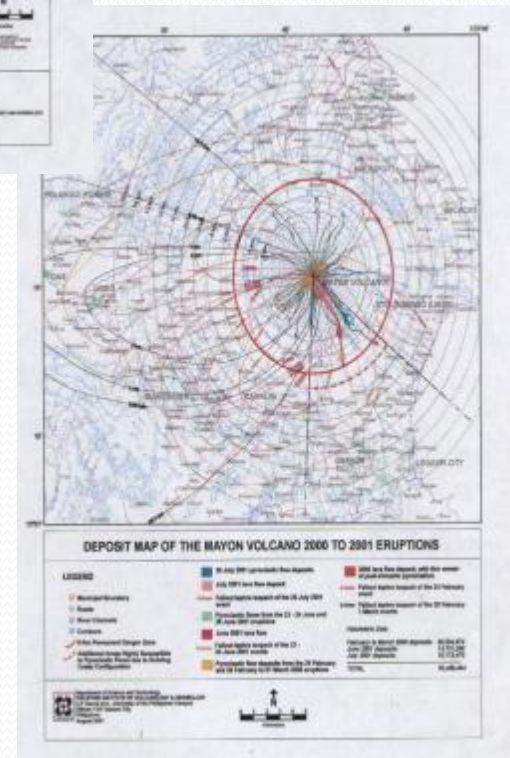
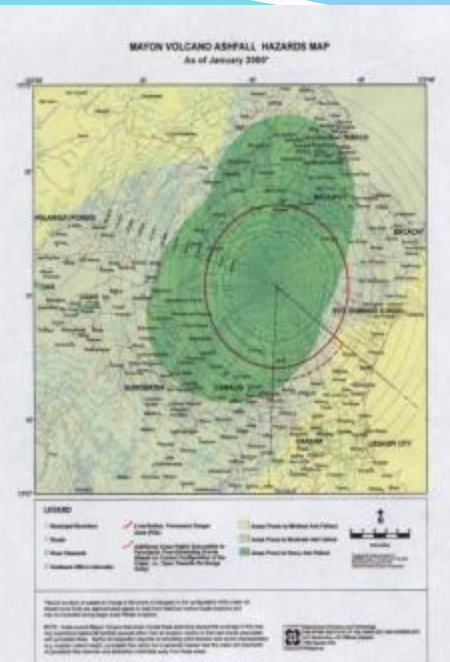
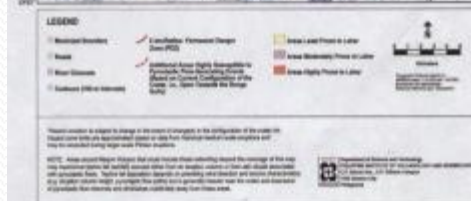
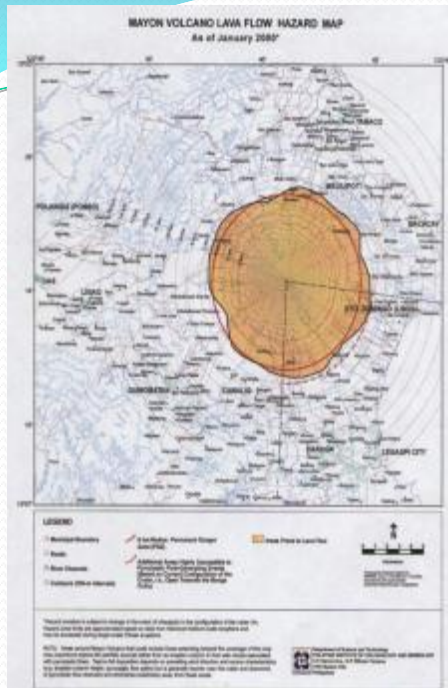


Ligao Landslide Map

TSUNAMI



VOLCANIC HAZARDS

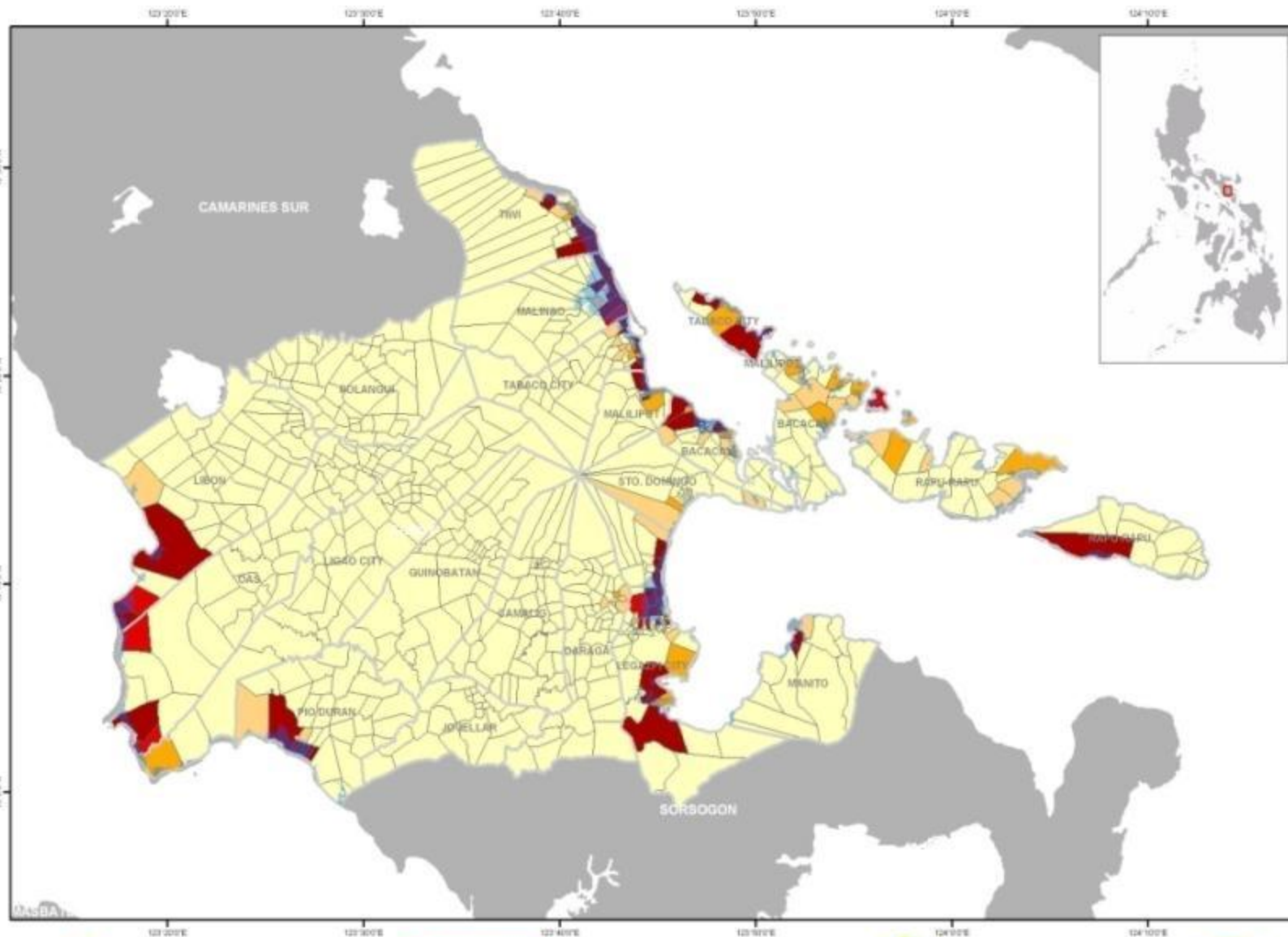


[illegible]

Map Production:
Manila Observatory
Map Produced by:
Engr. Joel de Mesa
Annelle Roca Remedio
Projection:
GCS Luzon Datum



Coastal Flooding Risk Map of Albay Province, Philippines



MAP INFORMATION

This map illustrates the risk posed by coastal flooding in Albay province.

High risk areas are low lying barangays near the coast, as well as, being densely populated with high numbers of poor people.

Coastal flooding is the inundation of land areas along the oceanic coast by sea waters over and above normal tidal action. (MetEd)

Risk (R) is the product of the Hazard (H), Exposure (E) and Vulnerability (V) or $R = H \times E \times V$ where:

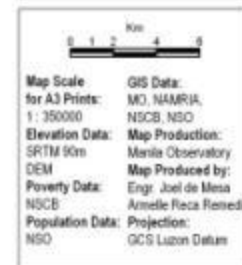
H = Coastal Flood Hazard Score
 E = Population Density
 V = Number of Poor People

The Coastal Flood Hazard Score (H) was computed for each barangay of the study area using the formula:

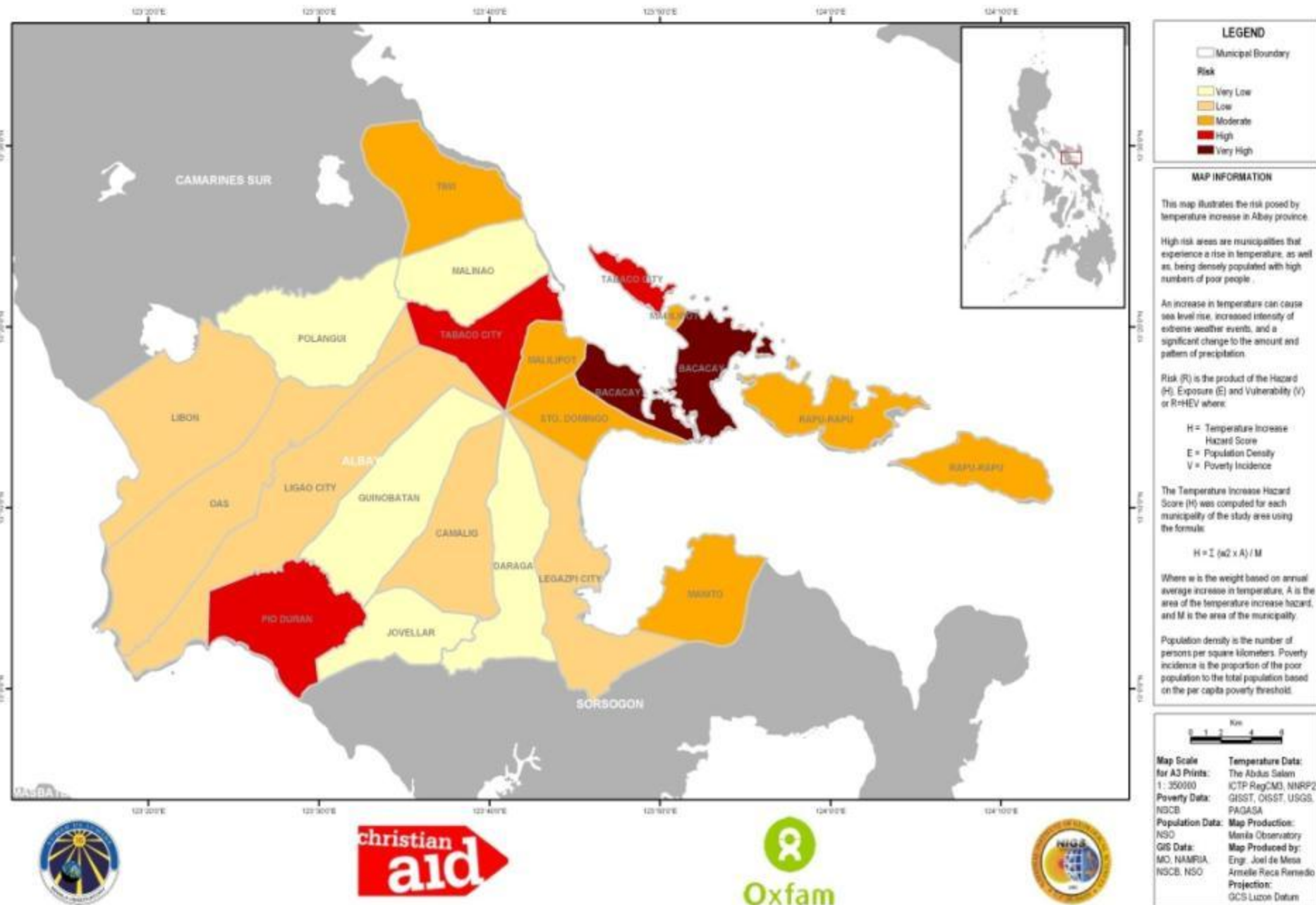
$$H = \sum (e \times d \times A)$$

Where e and d are the weights based on elevation and distance from the coast line, and A is the area of the coastal flood hazard.

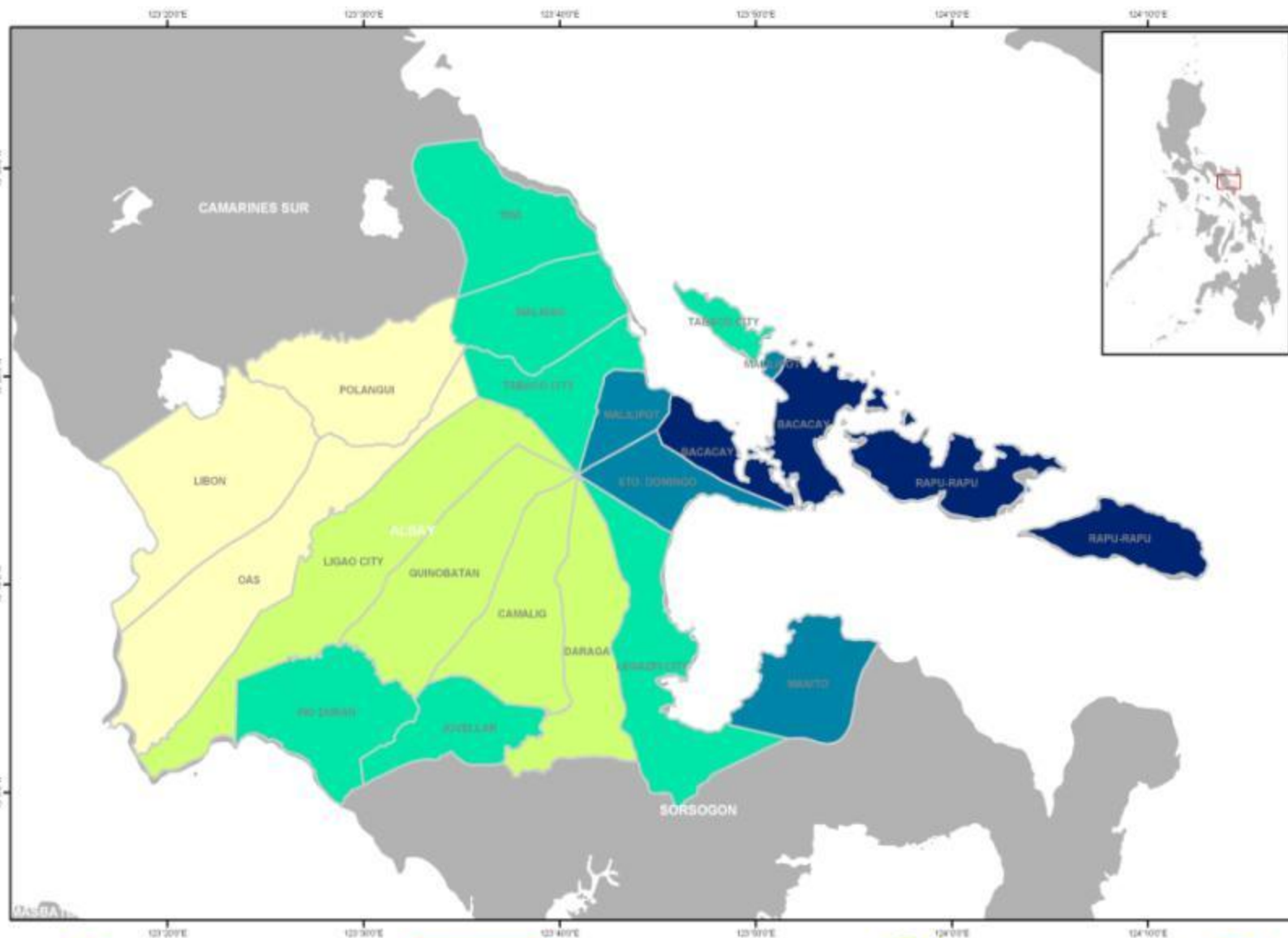
Population density is the number of persons per square kilometers. Due to lack of available data at the barangay scale, the number of poor people was estimated by multiplying the municipal poverty incidence by the barangay population.



Temperature Increase Risk Map of Albay Province, Philippines



Rainfall Increase Hazard Map (Dry Season) of Albay Province, Philippines



LEGEND

— Municipal Boundary

Hazard

Very Low

Low

Moderate

High

Very High

MAP INFORMATION

This map illustrates the hazard posed by rainfall increase in Albay province.

High hazard areas are municipalities that experience rainfall increase in the months of March, April and May.

Rainfall is the primary trigger of lahar flow, landslides, and flood.

Risk (R) is the product of the Hazard (H), Exposure (E) and Vulnerability (V) or $R = H \times E \times V$ where:

H = Rainfall Increase Hazard

Score

E = Population Density

V = Poverty Incidence

The Rainfall Increase Hazard Score (H) was computed for each municipality of the study area using the formula:

$$H = \sum (w_i \times A_i) / M$$

Where w_i is the weight based on the 3-monthly average increase in accumulated rainfall, A_i is the area of the rainfall increase hazard, and M is the area of the municipality.

Population density is the number of persons per square kilometers.

Poverty incidence is the proportion of the poor population to the total population based on the per capita poverty threshold.



Map Scale

for A3 Prints:

1: 350000

Poverty Data:

NSCB

Population Data:

NSO

GIS Data:

MO, NAMRIA,

NSCB, NSO

Rainfall Data:

The Abdus Salam

ICTP RegCM3, NINRP2,

GISST, GISST, USGS,

PAGASA

Map Production:

Manila Observatory

Map Produced by:

Engr. Joel de Mesa

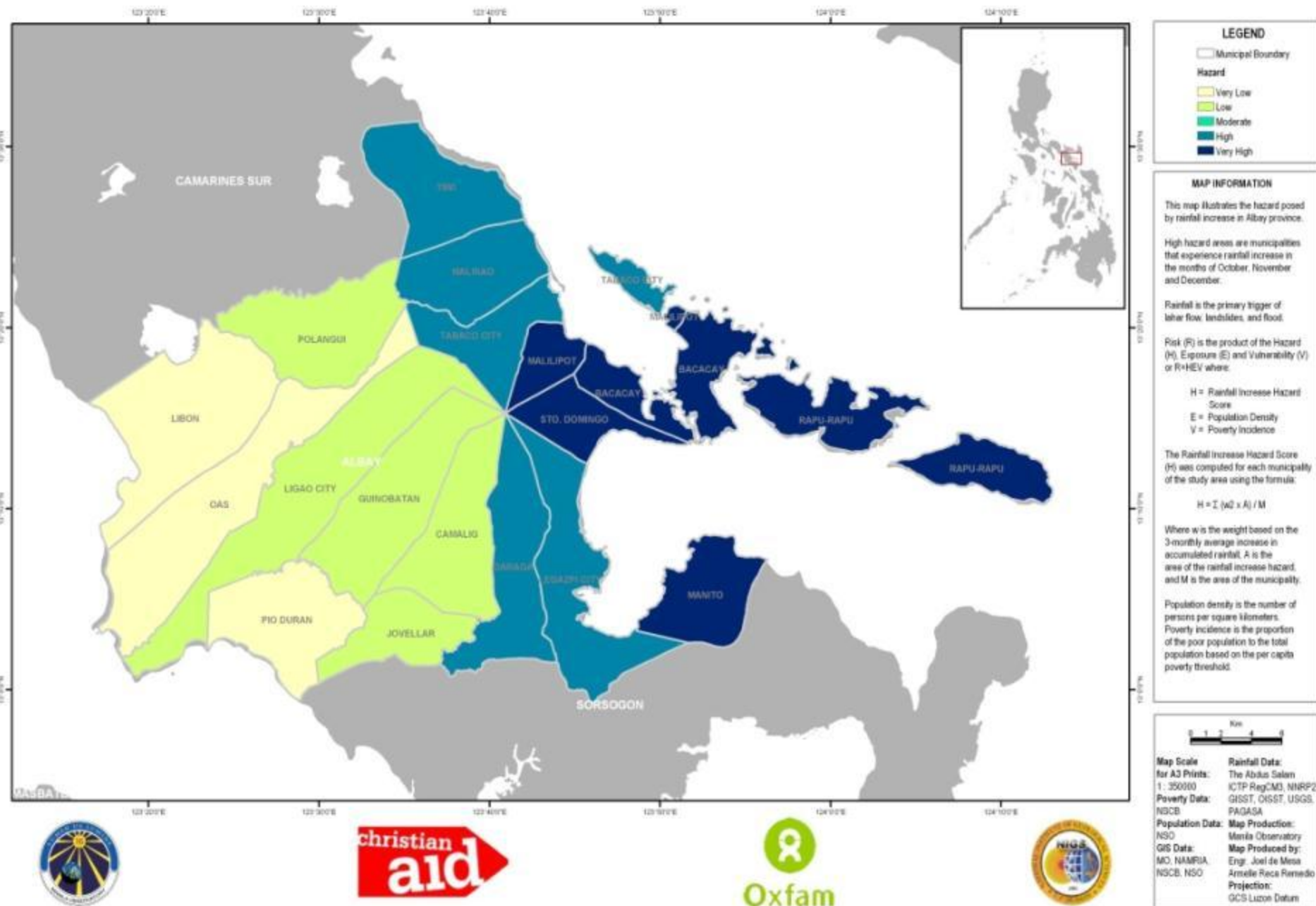
Armelle Reza Remedio

Projection:

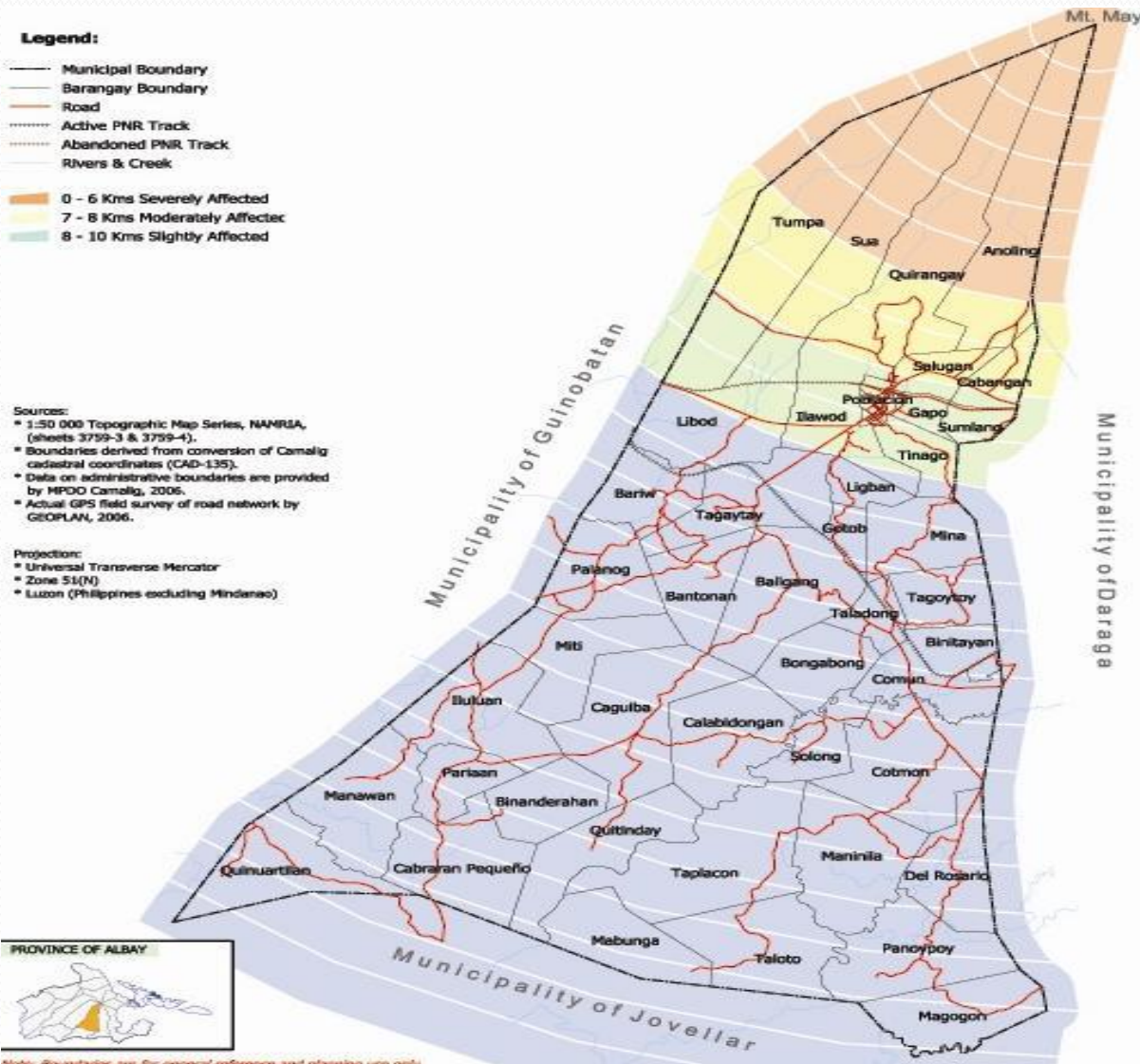
GCS Luzon Datum



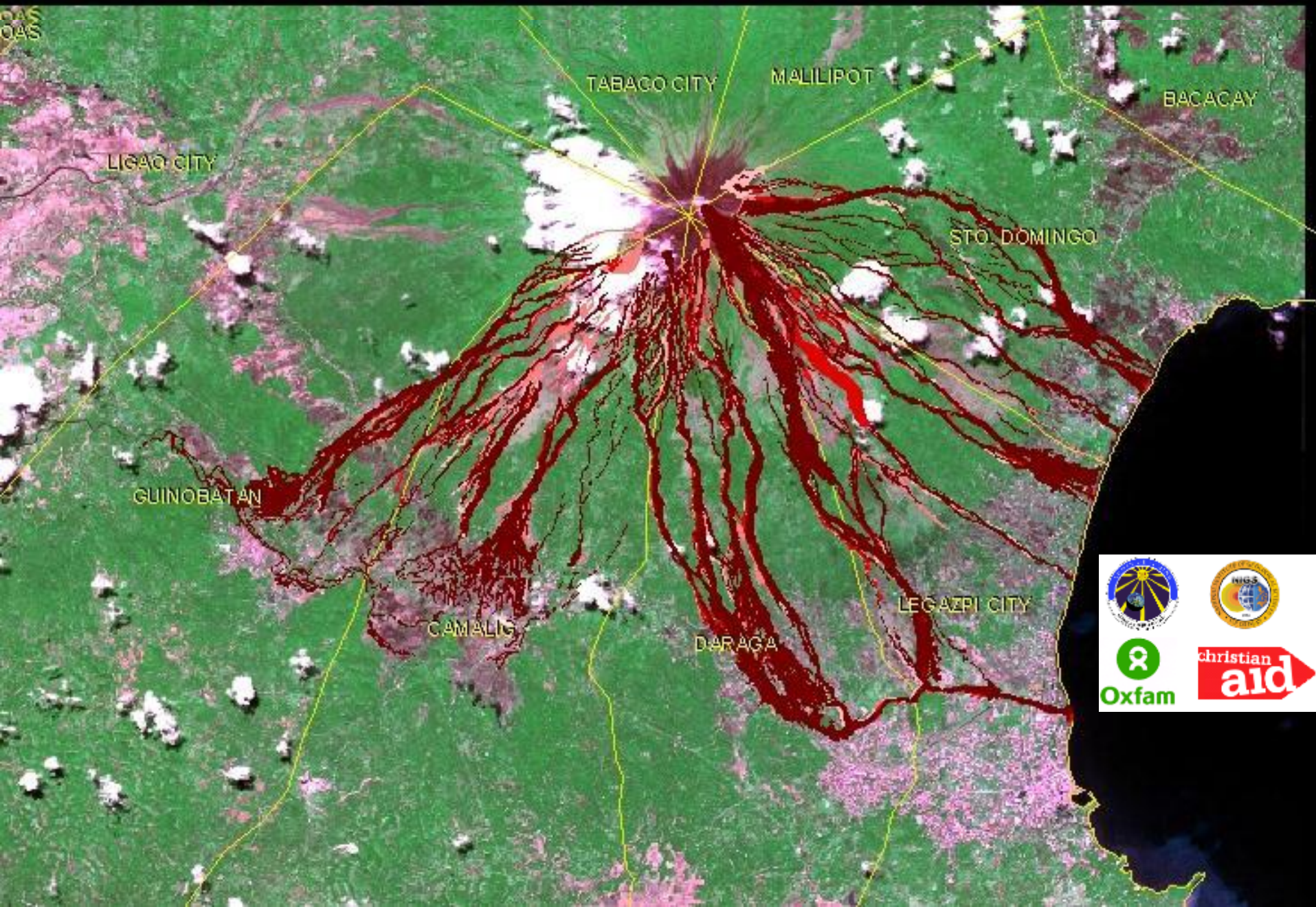
Rainfall Increase Hazard Map (Wet Season) of Albay Province, Philippines



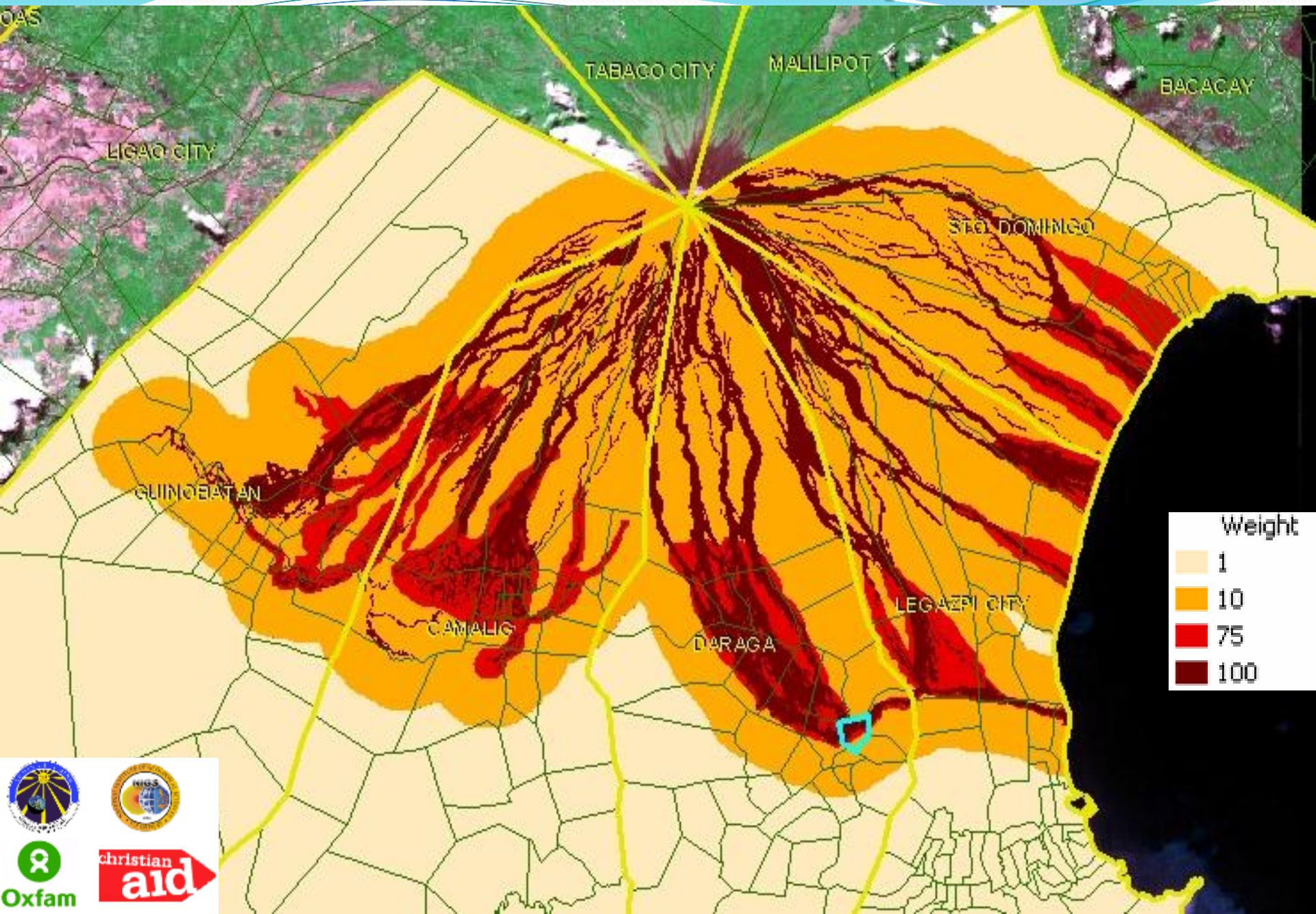
Risk Mapping



Lahar Hazard Map



Lahar Hazard Map



$$\text{HAZARD SCORE} = \sum(w^2 \times \text{Area})$$



$$\text{LAHAR HAZARD SCORE} = 100^2 (A1) + 75^2 (A2) + 10^2 (A3)$$

Risk Reduction: Engineering Interventions

- **Engineering Interventions**
 - **Flood Control**
 - Phase 1 of Legazpi Flood Control already approved for DPWH funding in 2012 GAA: P575m out of total P2.1bn
 - **Bicol River Basin and Watershed Project**
 - Flood control for flood plains
 - Watershed protection and reforestation
 - Irrigation rehabilitation
 - Multi-year P3.4bn
 - **Source of Funds**
 - World Bank country assistance with NG counterpart

Albay Provl Devt Investment Plan 2011-16

NAME OF PROJECT/PROGRAM	TOTAL PROJECT COST
DRR/CCA Receptive Infrastructure PPAs	
1. GUICADALE ROAD PROJECTS	2,893,657,402.71
2. SOUTHERN LUZON INTERNATIONAL AIRPORT	3,400,000,000.00
3. ALBAY WEST COAST ROAD	663,520,000.00
4. BICOL ALTERNATIVE HIGHWAY - DARAGA - OAS SECTION	250,000,000.00
5. OAS -CAGMANABA ROAD	250,000,000.00
6. COMPREHENSIVE DISASTER PREVENTION AROUND MAYON VOLCANO	39,257,300,000.00
7. SAFE SCHOOLS	592,195,000.00
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SUB-TOTAL	50,585,704,202.71
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GRAND TOTAL	80,638,000,000.00

Bicol River Basin Flood Control

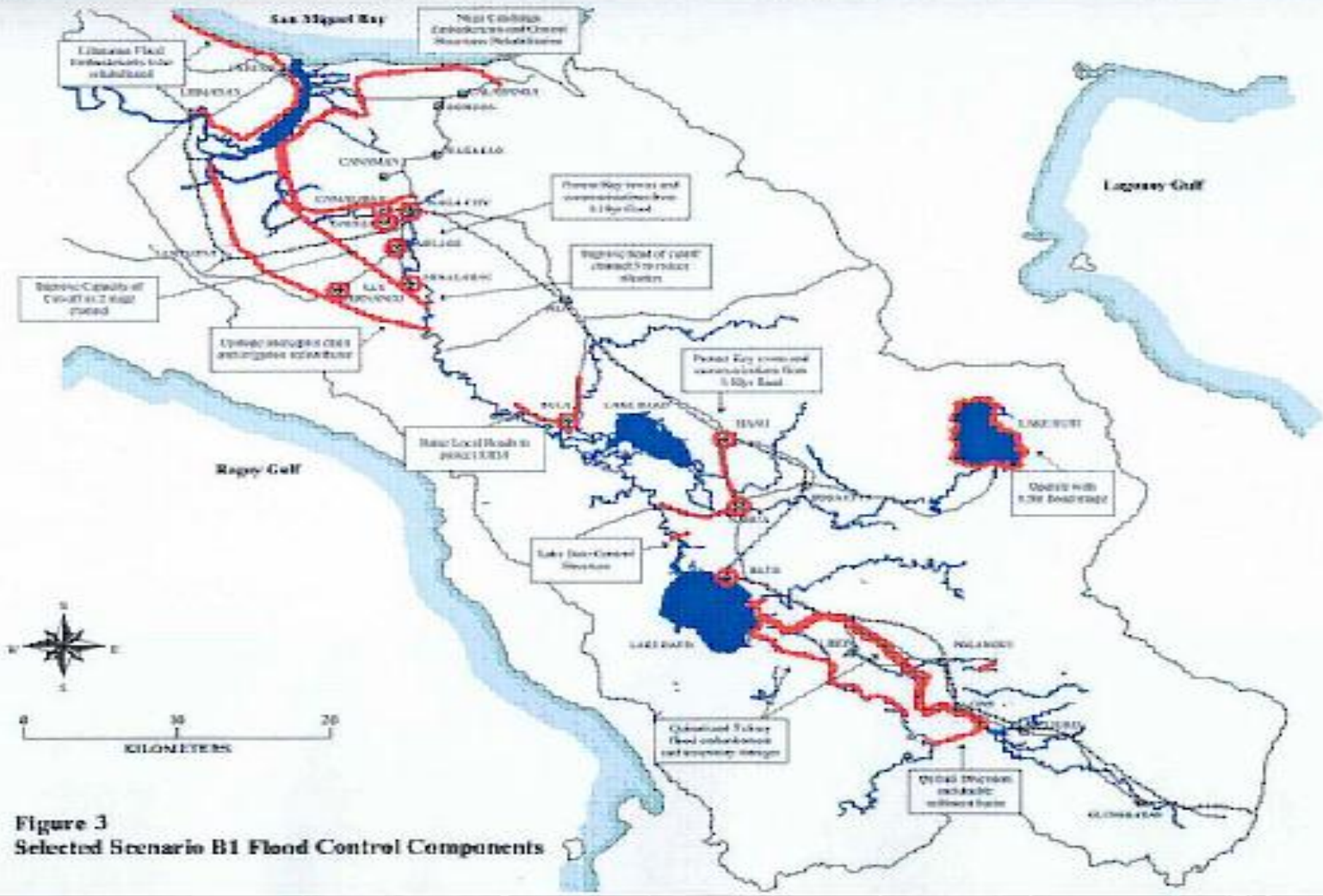


Figure 3
Selected Scenario B1 Flood Control Components

Engineering Interventions: Biggest Gap



Resources for Social Preparations

- **Continuous Training and Education**

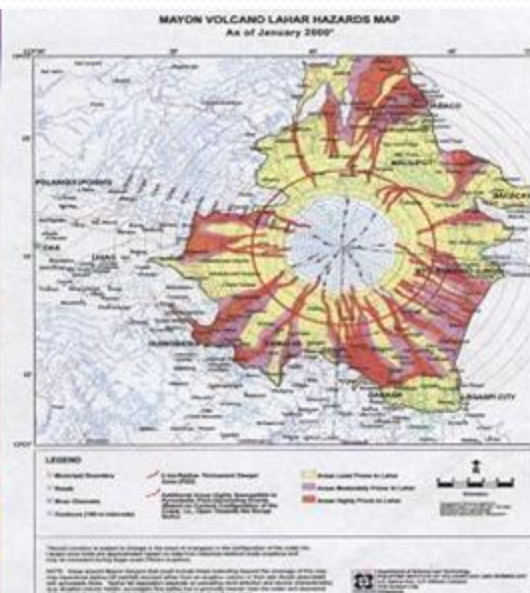
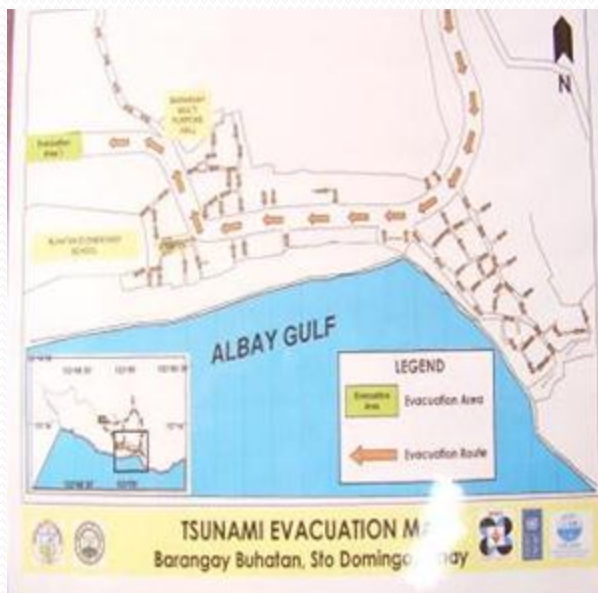
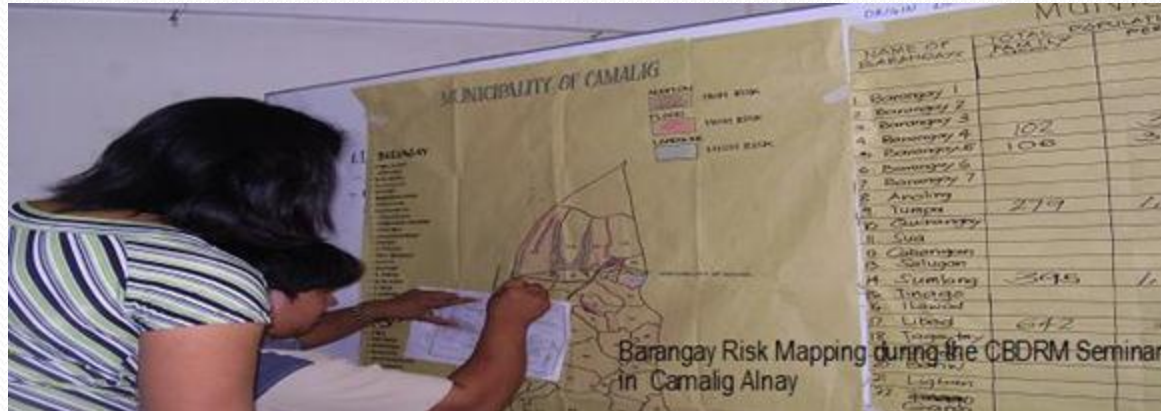
- **Components**

- Household preparedness
 - Community preparedness (first responder capacity)
 - LGU preparedness (first integrator)
 - Skills development for government and volunteers
 - Warning System Communication Protocol and Evacuation Procedures
 - Evacuation and Community Kitchen Management
 - Mountain Survival and compass reading
 - Critical Incidence Stress Debriefing
 - Community Risk Mapping and Contingency Planning
 - Education-On-Air with local broadcast media
 - Conduct of drills and exercises in schools, hospitals, hotels, malls and communities to pre-test the hazard specific contingency plan on volcanic eruption, earthquake typhoon and fire
 - Continuous and Periodic Education and Training

- **Source of Funds**

- Regular annual provincial budget

Social Preparations



Community Training and Seminar



TAGAS VULNERABILITY / CAPABILITY ASSESS	
VULNERABILITY	CAPABILITY
1. FLOOD PRONE AREA - YAWA RIVER	1. MOST RESIDENTS HAVE CELEBRITY AND OTHER MEANS OF COMMUNICATION
2. MORE OR LESS 30 DISABLED RESIDENTS	2. MOST RESIDENTS WERE ABOVE AVERAGE IN INCOME LEVELS
3. PRONE TO TRAFFIC ACCIDENTS DUE TO LACK OF TRAFFIC LIGHTS	3. PRESENCE OF VARIOUS BUS ESTABLISHMENTS
4. LACK OF STREET LIGHTS	4. NEAR THE TOWN PROPER
5. INADEQUATE DRAINAGE SYSTEM	5. CENTER OF HEALTH SERVICE RESIDENTS PHYSICIAN AND 1 HEALTH WORKERS
6. LACK OF WATER FACILITIES FOR DRINKING & HYGIENE CONSUMPTION	6. CENTER OF RELIGIOUS ST
7. TARGETS OF ROBBERY DUE TO LACKING AFFLUENCE	7. NEAR TO THE AIRPORT
8. JUVENILE DELINQUENCY	8. WITH 2 STOREY BANG HALL
9. WITH CASES OF MARIJUANA	9. HAS MOBILE FAIR
10. SOME PUBLIC WITH INADEQUATE ROAD SYSTEM	10. SUFFICIENT IN BAC

Community Drills



Training of Emergency Paramedics



Training of Rescue Team



Starting them early



Children DRR through Games



Children DRR through Magic



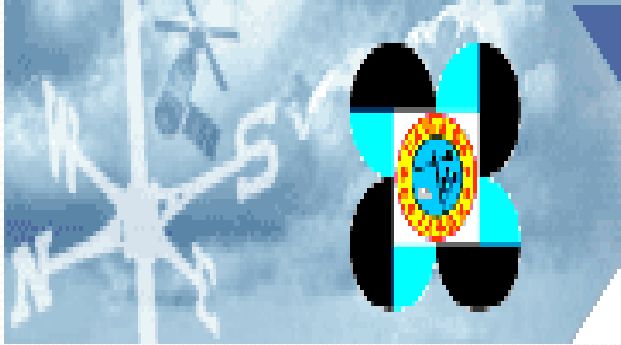
Resources for Preparedness

- **Close coordination with warning agencies**
 - Pagasa is sole authority
 - Establishment of Regional Weather Bureau in Legazpi
 - Upper air balloon to improve detection
 - JICA Reming assistance: Doppler radar in Virac
- **Community-based warning system**
 - Rainfall monitoring at village level
 - Continuous training
 - Source of Funds: Provincial Government budget
- **Warning communications protocol**
 - Infoboard
 - Assigned 15,750 SIM cards to village officials
 - Source of Funds: CSR of Smart

Doppler Radar



Community-Based Early Warning



Warning
Agencies

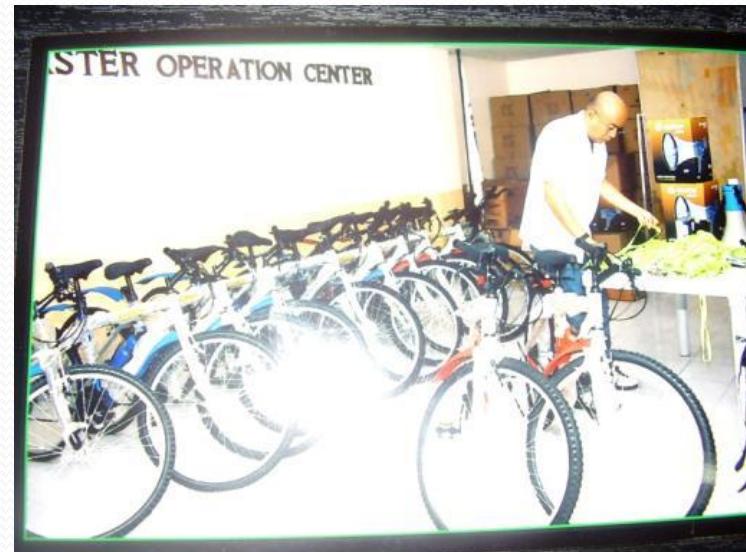
APSEMO



Communities
LGUS



Community-based Warning Communications

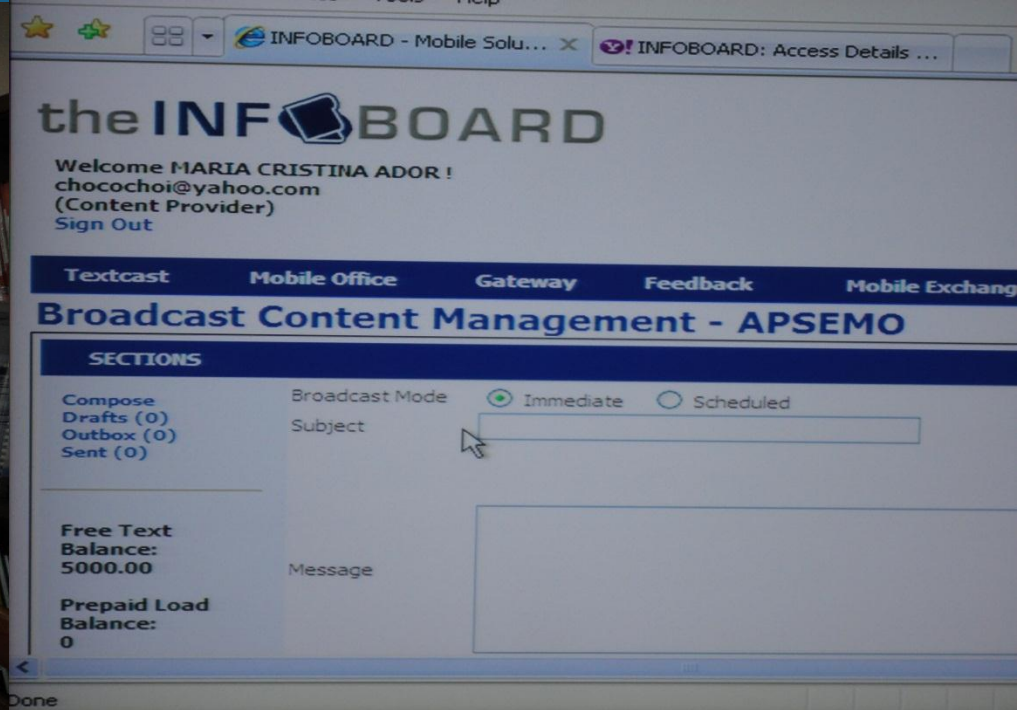
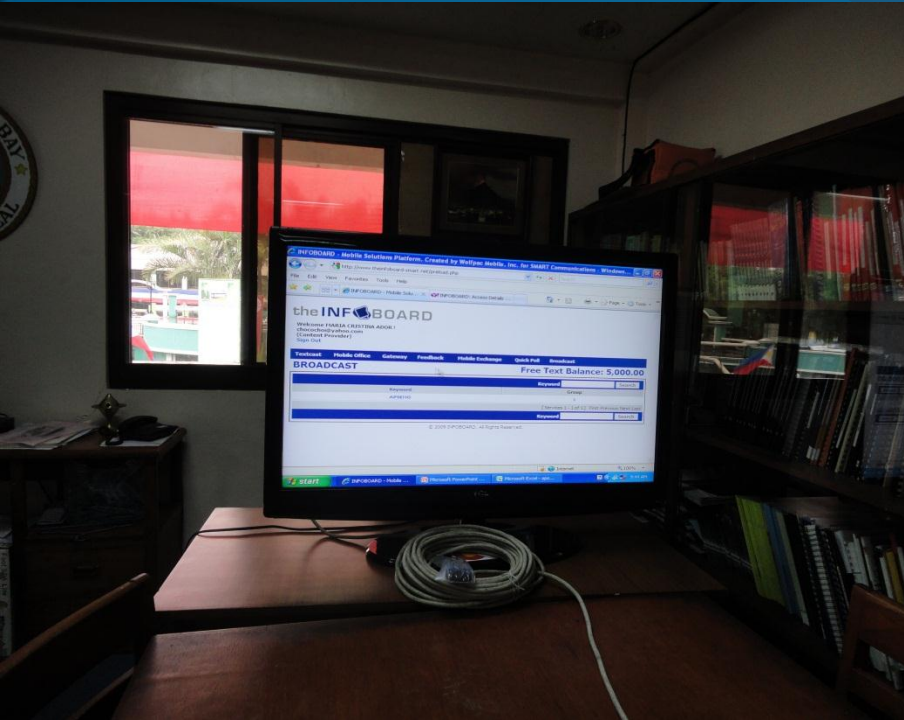


Community Disaster Preparedness and Response Activities (Organizing, Education and Trainings)

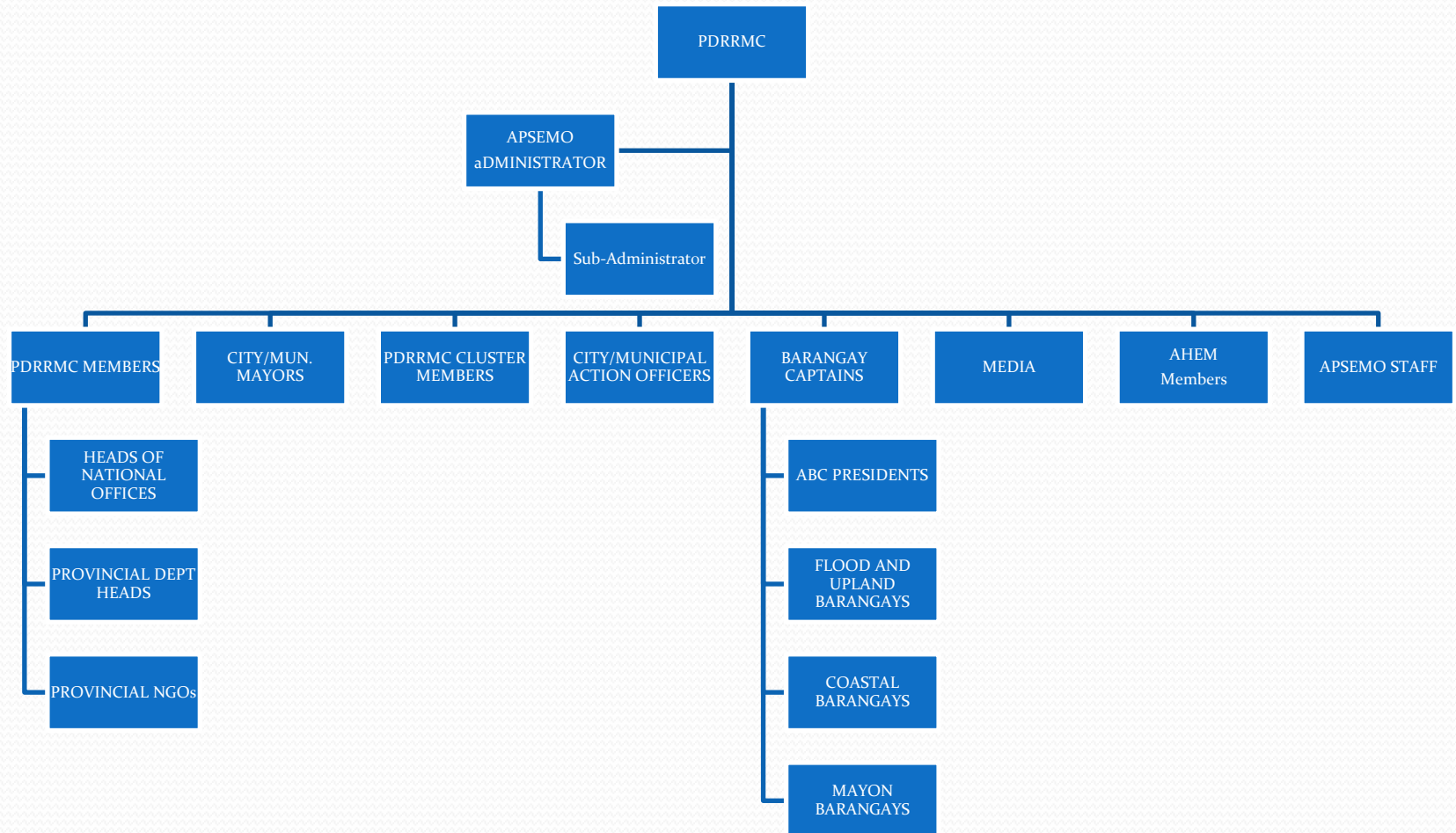


PDRRMC INFOBOARD

Province of Albay
May 2011



Operational Structure



Functional Structure

- ▶ PDRRMC Executive Office/ APSEMO Dept Head– serve as the administrator of the infoboard.
- ▶ APSEMO Selected Staff as Sub-Administrators.
 - Collect and register the cp numbers of all the target recipients in the Province of Albay.
 - Send emergency communications to selected segment.
- ▶ Sectors– recipients of the information sent by the administrator.
- ▶ Smart Phil – provides free initial sending cost of P30,000
- ▶ PDRRMC may request additional allocation as maybe needed.
- Feedback will be received by APSEMO by sending “APSEMO space FEEDBACK space (Message) send to 70025229

Uses of Infoboard

▶ Sending

- important and emergency communication and information to the concerned recipients like:
 - PAGASA and PHIVOLCS bulletins
 - PDRRMC Advisories
 - Emergency instructions from the governor
 - Public Announcements
 - Other important messages

▶ Receive

- Feedback from the recipients.
- Distress call from the barangay.

▶ Other Uses

- Data gathering and validation
- Updates of weather, flood and landslide situations from the field.
- Dispatch and monitoring of emergency quick response teams (SAR)
- Media relations.
- DRRMC Coordination
- Invitations for emergency conferences

MAINTENANCE AND SUSTAINABILITY

- Minimal budget allocation from PGA through APSEMO.
- Good SMART communication signal in the field
- Use of mobile phone using SMART sim cards or sim cards of other networks
- Phone numbers recognized are those registered by APSEMO to avoid spam messages.
- Use of computer hardwares existing at APSEMO.
- Operations and maintenance of INFOBOARD are through the organic personnel of APSEMO.



SMART SIM PACK for the EARLY WARNING MONITORING SYSTEM

10% DISCOUNT

LCC Malls (supermarket & department stores)
Max's Restaurant (Pacific Mall)
McDonalds Restaurant (Pacific Mall)



Physical Capacity-Building: Mobility Assets could evacuate 160,000 persons/day

	LGU Provincial	Nat'l Agencies	Private
Ambulance	59	4	7
Rubber boats	18	8	
Passenger Trucks	3	54	300+
Helicopter		4	1
Firetrucks		26	8
Water Purifying Machine	1 (32t li/hr) from AECID		
Water Tank Lorry	1 worth P3m		
Com Vehicle	1 worth P14m		

Capacity Buildup: Mobility and Communications



Resources for Preemptive Evacuation

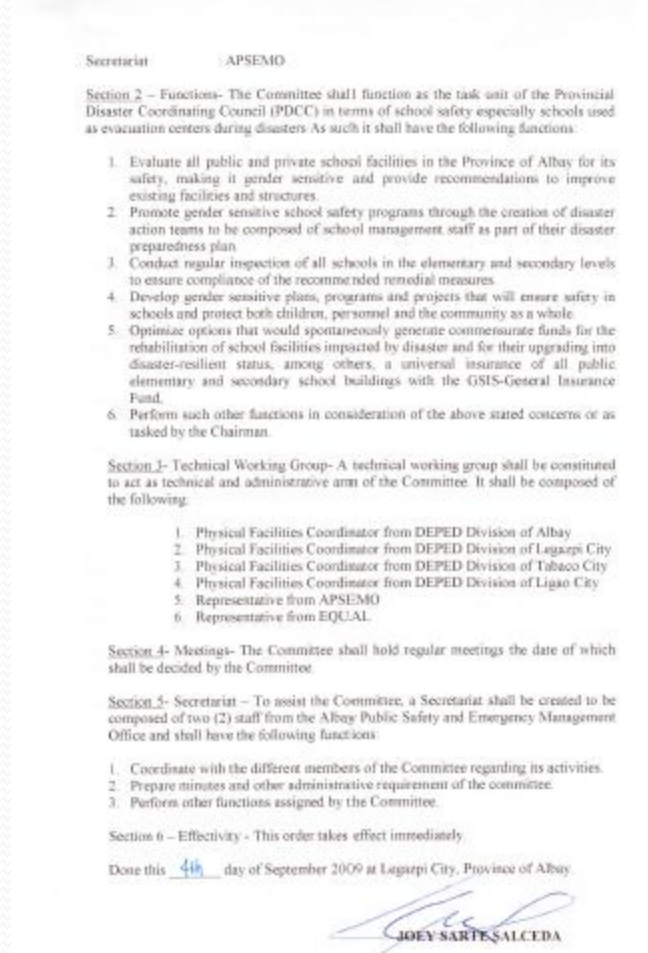
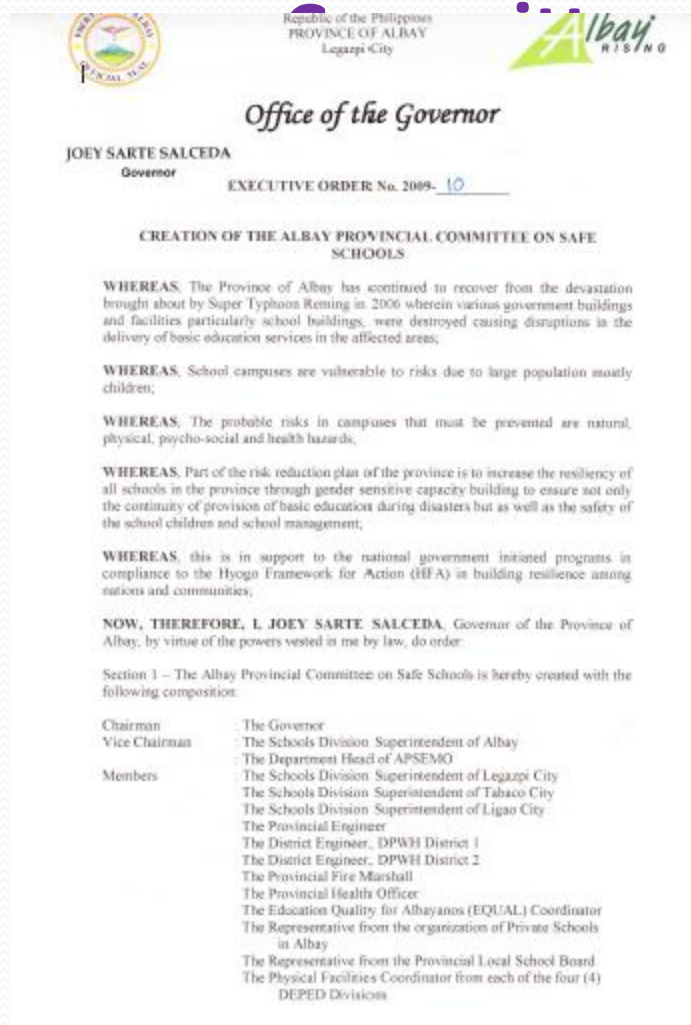
• Safe Evacuation Centers

- Construction of Emergency Evacuation Centers.
 - In times of no disaster, they will operate as classrooms or in the case of Daraga as municipal activity centers
 - Cost: P250m
 - Source of Funding: AECID, Deped, LGUs
- Emergency Educational Preparedness Program for Mayon Volcano Disaster Areas
 - In times of no disaster, they will operate as schools
 - Cost: P780m
 - Source of Funding: JICA

• Safe Schools

- Validation survey of all school buildings for structural safety (design), safety from hazards (location) and safety for health
- Provision of water-sanitation facilities to 700 school buildings
- Source of Funds: DOH HEMS-Unicef

Executive Order Creating Albay Provincial on Safe Schools



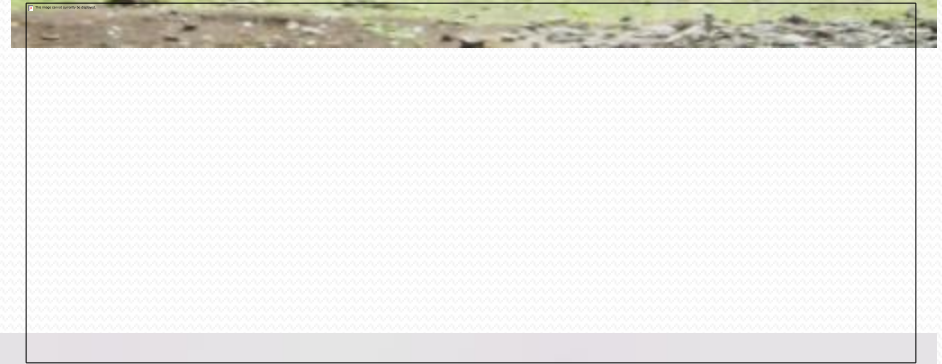
Physical Capacity-Building: Evacuation Centers up to 320,000 persons

Permanent Evacuation Centers (Provincial Government)	3 constructed by Provincial Government funded by AECID 3 being procured funded by AECID 5 are planned, funded by JICA Total Capacity: 10,200
School Camps (National Government)	5,128 classrooms of the Dept of Education identified as safe evacuation centers Total Capacity: 320,000

Permanent Evacuation Centers

6 Emergency Evacuation Center from AECID:

- Daraga – Completed as of December 2008
- Guinobatan – 95% Completed
- Camalig – 95% Completed
- Malilipot- For Construction
- Tabaco City- For Construction
- Ligao City- For Construction



Permanent Relocation Centers



AECID Emergency Evacuation Centers



Costing P30M each the EEC consist of:

- 10 classrooms (100 Families or 600 Persons)
- 4 office spaces
- 1 community kitchen
- Gender-sensitive WASH: 2 separate bath for 15Male and 15Female
- 2 separate Toilets for 15Male and 15Female (with 1 dedicated for Differently Abled Persons)
- 1 Power House
- 1 Water Pump
- 4 Overhead Water Tanks
- 1 Supply Room for Relief Commodities

Resources for Preemptive Evacuation

JICA Emergency Evacuation Centers (For Construction in 2010)

6 EEC in the following areas:

1. Sto Domingo (Mayon Eruption, Lahar)
2. Legazpi City (Mayon Eruption, Lahar)
3. Manito (Flooding,Landslide)
4. Libon (Flooding)
5. Polangui (Flooding)
6. Oas (Flooding)

Resources for Preemptive Evacuation

JICA EEC Facilities: (Cost P50M each)

- Two Storey Building
- 20 classrooms (200 Families or 1,200 Persons)
- 4 office spaces
- 1 community kitchen
- 2 separate bath for Male and Female
- 2 separate Toilets for Male and Female
(with 2 dedicated for Differently Abled Persons)
- 1 Power House
- 1 Water Pump
- 4 Overhead Water Tanks
- 1 Supply Room for Relief Commodities

Disaster Response: Preemptive Evacuation

- **Preemptive Evacuation**

- Preemptive evacuation is our key response mechanism to achieve zero casualty goal
- Based on gravity and proximity of risk,
 - Evacuate on Signal 1 or 2 instead of Signal 3
- Practiced 7 times (Typhoon Mina, TECF and Typhoon Frank, Ondoy, Pepeng, LPA and Santi, Mayon eruption)
- Evacuation protocols are well-established
- Ready budget also critical
 - Calamity Fund balance maintained sufficient for a frequency of 3 major preemptive evacuations

Those who have less in life, have more in risks

- Disasters kill poor (mostly young) people, make the poor poorer and breed more poor people. Thus, it hurts the innocent and constitutes a moral failure. Social justice is the fundamental basis of DRR/CCA.
- It is the primordial duty of the state to save the vulnerable from disasters, climate change
 - The more disasters: the higher the rights of the vulnerable, the higher the duties of the state.
 - **Zero casualty goal is a desirably ambitious and a socially desirable goal of the nation** *[Jesuits call it: holy desires]*
- No relocation, if homes are built safely. No evacuation, if vulnerable are relocated. No rescue, if evacuated. No rehab, if homes are built safely.

Those who have less in life, have more in risks

- People have the basic right to the capacity to adapt. Relief, recovery and rehab is essentially a compensation [penalty] of the state for failing to reduce exposure and to increase capacity.
- Given zero casualty goal, socio-economic impacts are the state imperatives as they require inter-class, inter-spatial and inter-temporal risk transfers.



THANK YOU

